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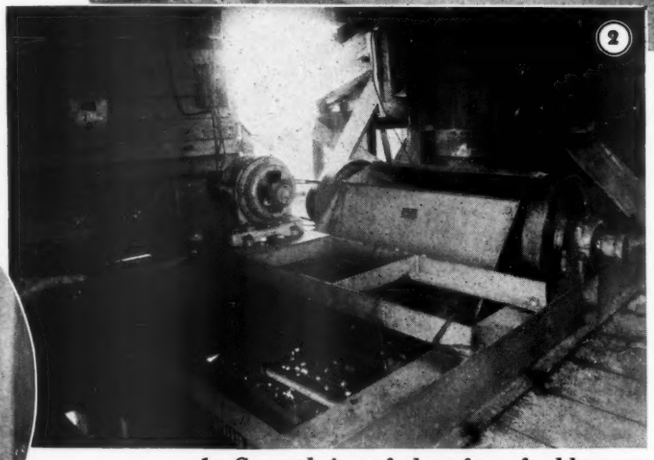
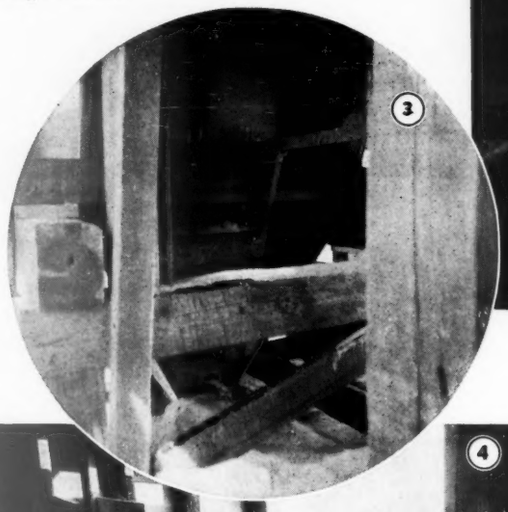
IT'S TELSMITH EQUIPMENT

AT THE TUSKEGEE SAND AND GRAVEL COMPANY PLANT

● This modern, all-electric powered plant of the Tuskegee Sand & Gravel Co., Tuskegee, Ala., is a fine example of both Telsmith equipment and Telsmith engineering service. The Tuskegee gravel washing plant, started early in 1938, is turning out 125 tons per hour, 30 per cent of which is pumped. Its five bins have a total capacity of 400 tons.

Gravel from the pit is hauled ¼ mile to the plant in 5-yd. side-dump cars, dumped into a 30-yd. hopper, and fed by a Telsmith Plate Feeder to a belt conveyor, which discharges to a 4 x 12-ft. Telsmith Four-Deck Pulsator driven by a 10-hp. motor.





1—General view of plant from feed hopper.
2—4' x 12' Telsmith four-deck Pulsator.
3—No. 8 Telsmith Sand Tank.
4—No. 32-B Telsmith Reduction Crusher.

Material is washed over this Telsmith vibrating screen under pressure; 900 g.p.m. of wash water being delivered by a motor-driven pump. Three sizes of gravel are produced. "Throughs" from its sand deck are flumed to a No. 8 Telsmith Sand Tank. With two sets of interchangeable screen trays, either concrete or mortar sand is recovered, as desired.

Oversize gravel from the screen goes to a bin with a slide gate which passes it right into the crusher. Working at choke feed, the No. 32 Telsmith Reduction Crusher takes it as fast as it comes—discharges to portable belt conveyor which loads it into railway cars. Using a 40-hp. motor with V-Belt drive, this Telsmith Crusher is very economical of power.

Telsmith designs and equips complete gravel pit and quarry plants . . . stationary, semi-portable or portable . . . exactly to fit *your* needs. High-grade equipment, sound engineering and centralized responsibility assure satisfaction to the buyer. *Write for Bulletin G-15.* GC-5-39

SMITH ENGINEERING WORKS
504 E. CAPITOL DRIVE MILWAUKEE, WIS.
Cable Addresses: Sengworks, Milwaukee—Concrete, London
Associates in Canada: Canadian Vickers, Limited, Montreal and Vancouver

50 Church Street New York City	211 W. Wacker Drive Chicago, Ill.	713 Commercial Trust Bldg. Philadelphia, Pa.
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TELSMITH

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with MANHATTAN HOSE *on the job*

Condor Steam Hose on pile driver on large bridge of State Highway project.

Manhattan Air Hose on wagon drills on large Hydro-Electric project.

WHEREVER you find men working—in mines, quarries, mills, construction—with Manhattan Hose, you can be sure of speed and performance. That's because Manhattan Hose has been designed and built to stick to the job, take the punishment of severe service, without time out for repairs or replacements.

Perhaps that is why more and more men responsible for getting work done specify Manhattan Hose. They know from experience that performance like this means real operating economy.

No matter what your requirements—for air, water, steam or suction service—put a Manhattan Hose on the job to keep it on schedule . . . and within your budget. Write for your copy of an illustrated folder describing Manhattan Hose in detail.

Condor PRODUCTS

- Conveyor and Elevator Belt
- Transmission Belt
- V-Belt
- Air Hose
- Contractors Hose
- Fire Hose
- Hydraulic Hose
- Oil and Gasoline Hose
- Sand Blast Hose
- Steam Hose
- Suction Hose
- Water Hose
- Chute Lining
- Launder Lining
- Industrial Brake Blocks and Lining
- Molded Rubber Goods
- Rubber Lined Tanks
- Rubber Covered Rolls
- Abrasive Wheels

THE MANHATTAN RUBBER MFG. DIVISION
OF RAYBESTOS-MANHATTAN, INC.
EXECUTIVE OFFICES AND FACTORIES
Passaic, N. J.

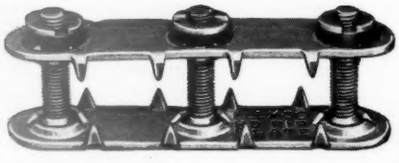
PIT AND QUARRY, March, 1939. Vol. 31, No. 9. Published monthly by the Complete Service Publishing Company, 538 South Clark Street, Chicago, Ill. Subscription price $1 for 1 year in the U. S. and possessions, Canada, Central and South America; elsewhere $1 additional for each year. Single copies 20 cents. Entered as second-class matter February 28, 1932, at the Post Office at Chicago, Ill., under the act of March 3, 1897.

OFF AGAIN! ON AGAIN! GONE AGAIN! —FINNEGAN

WHEN Flexco HD Belt Fasteners and Alligator Steel Belt Lacing are used, the reports on belt maintenance jobs in sand and gravel and rock products plants read a good deal like Strickland Gillilan's Irish section boss' telegram about the derailment of No. 9.

With Flexco HD Belt Fasteners for your conveyor and elevator lines and Alligator Steel Belt Lacing for your transmission belts you take all the grief out of your belt fastening and repair work.

You can get these great improvements in belt fastening practice from your supply house.

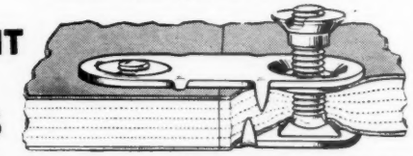


SALVAGING DAMAGED CONVEYOR BELTS

● FLEXCO HD Rip Plates offer a means of repairing damaged conveyor belting and returning it to satisfactory service. Their use saves expensive replacements and extended shut-downs.

For strengthening small weak or "soft" spots, where the belt is just beginning to fail, bridge them with FLEXCO HD Rip Plates. Regular inspection for weak spots is advisable.

A TIGHT BUTT JOINT FOR CONVEYOR BELTS

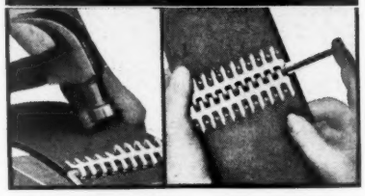


● Note how the recessed plates of FLEXCO HD Belt Fasteners compress the belt ends. Internal friction and ply separation in belt ends is overcome. The tight butt of the belt ends prevents passage of materials through the belt.

Regularly made of special analysis steel for general use. To meet unusual conditions, can be supplied in corrosion resisting "Monel," non-magnetic "Everdur" and abrasive resistant "Promal."

Sole Manufacturer—FLEXIBLE STEEL LACING CO.
4623 Lexington St., Chicago, Ill.

"JUST A HAMMER TO APPLY IT"



Over 200 million transmission belts have been laced with ALLIGATOR and here's why:

1. Without any fuss or monkey business it can be put on with a hammer and it drives straight.
2. It will handle the lacing problem for belts ranging from tapes 1/16" thick up to belts 5/8" thick and as wide as they come.
3. The belt can be unfastened in a jiffy —just remove the rocker hinge pin and the joint comes apart.
4. Alligator makes a joint that is smooth on both faces—it embeds in the belt and the compression grip protects the belt ends and keeps the plys from separating.
5. Alligator Steel Belt Lacing is made of a special grade of steel that combines ductility with high tensile strength. Service records show that it has remarkably long life.
6. It is supplied in Steel, "Monel" and "Everdur" in all twelve sizes.

ALLIGATOR
TRADE MARK REG. U.S. PAT. OFFICE
STEEL BELT LACING

● Folder WRP gives complete details on making butt joints, repairing rips and putting in patches.

WRITE FOR YOUR COPY

FLEXCO REG. U.S. PAT. OFFICE **HD BELT FASTENERS**
Sold by supply houses everywhere

LORAIN Scoops THE Field

with the NEW LORAIN-79

1½-YD. SHOVEL
25-TON CRANE

FEATURING

ALL-WELDED SHOVEL BOOM

Here's the strongest boom ever placed on a Lorain machine—a 23' all-welded boom of entirely new construction. Its Center Drive design makes for greater ranges, too, as proved by the fact that the Lorain-79 can dig practically 29' high with boom at 50°.

DOUBLE CENTER DRIVE TURNTABLE

And we do mean "double." Improved Center Drive design uses double pinion to send a greater flow of power into the hoist shaft equipped with bigger drums and more cable capacity. Add to this, simplicity of construction and direct application of power and there's your answer to a turntable design that can really give and take.

CENTER "CHAIN" DRIVE CRAWLER

It's longer, wider, heavier, stronger—yet the 2-speed Center "Chain" Drive Crawler moves the 1½-yd. Lorain-79 around with the agility of a ⅜-yd. unit. It will roll this 87,000-lb. machine right up a 30% grade—travels or steers in either direction. Watch it perform and you'll agree it has everything you ever wanted in a crawler—and then some.

For the complete story (and it's a good one) on the Lorain-79, write today for new catalog.

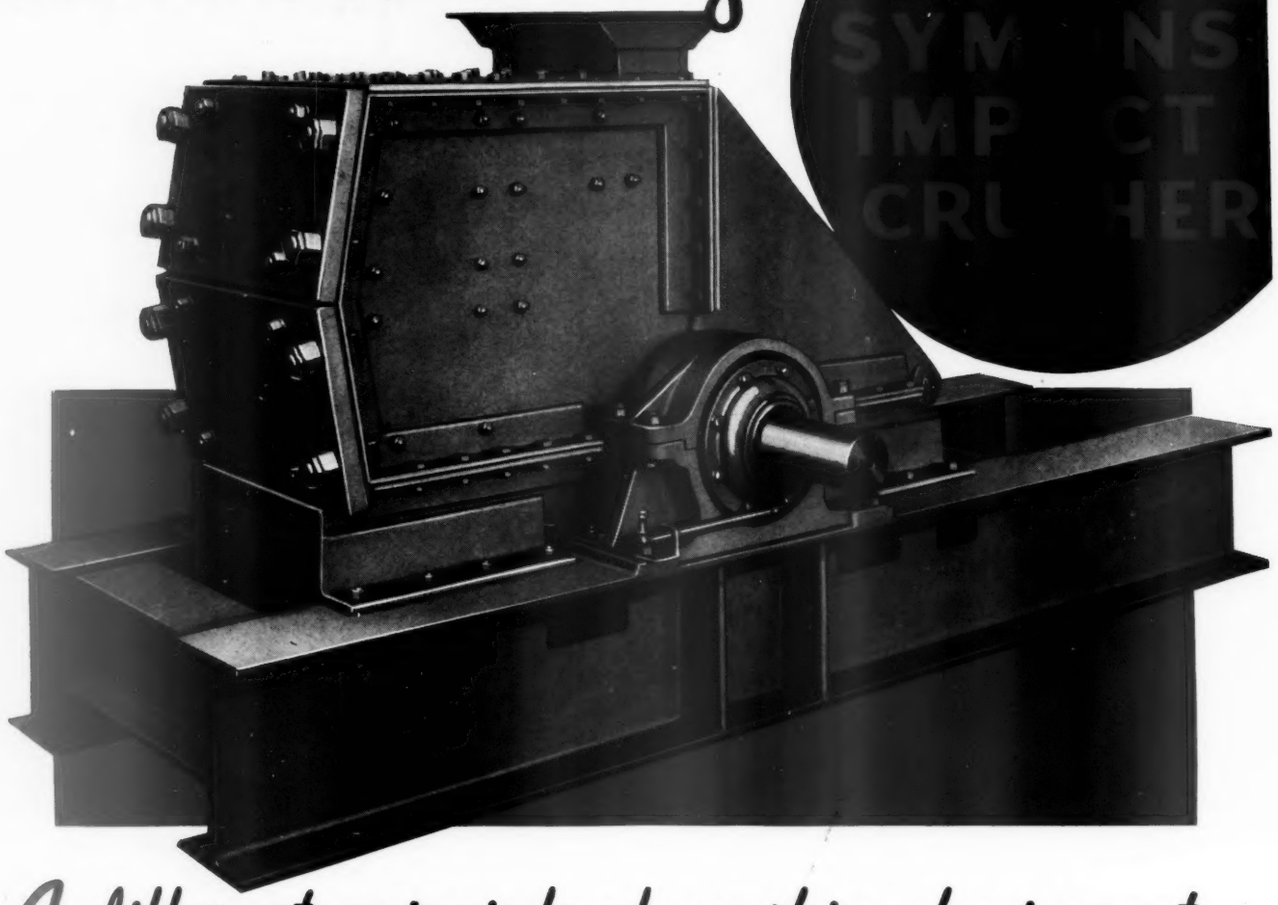
Plus

- Automatic Power Dipper Trip
- Automatic Crowd Brake
- All-Welded Dipper Stick
- Crawler Travel and Safety Lock
- Rustproof Tread Adjustment
- Two-piece Swing Drums with Reversible Clutch Bands
- Simultaneous Hoist . . . Swing and Travel

THEW CENTER DRIVE

THE THEW SHOVEL COMPANY LORAIN, OHIO

Announcing the NEW SYMONS IMPACT CRUSHER



A different principle of crushing by impact . . .

- **Makes a more cubical product . .**
- **Non-slip angle of impact . . .**
- **Less wear to crushing members .**
- **Maintenance expense reduced . .**
- **Helps eliminate soft stone . . .**

Here is a crusher that is as much of an advancement over other crushers operating on the impact principle as the Symons Cone was over the gyratory. Perhaps you have a crushing job that can best be done by this new crusher. *Investigate its features. Write for descriptive bulletin.*

NORDBERG MFG. CO., MILWAUKEE WISCONSIN

NEW YORK 60 E. 42nd St. | **LOS ANGELES** Subway Term. Bldg. | **TORONTO** Concourse Bldg. | **LONDON** Bush House

Tough Jobs need Tough Ropes

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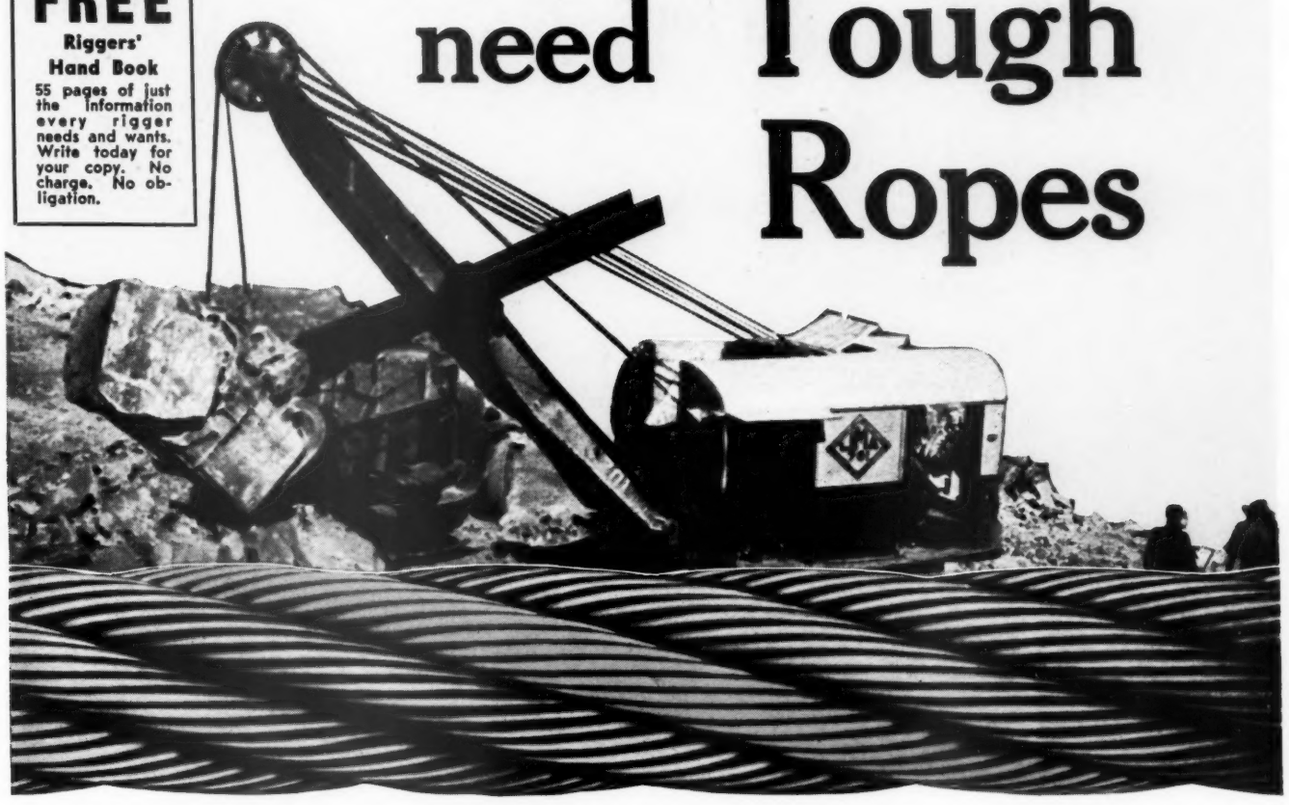
Riggers' Hand Book
55 pages of just the information every rigger needs and wants. Write today for your copy. No charge. No obligation.



And is "Flex-Set" Preformed Yellow Strand tough!

For many years "Yellow Strand" has meant "toughness" and "long life." Now, "preforming" makes this wonderful rope still tougher, and much longer lived.

By preforming, the wires and strands are shaped to their helical form before they go into the rope. The result is that "Flex-Set" Preformed Yellow Strand is practically pre-broken in—can be operated at full load and full speed sooner, with greatly reduced danger of damage.

The rope is more flexible, too; easier to handle and install; and it is highly resistant to drum crushing and fatigue.

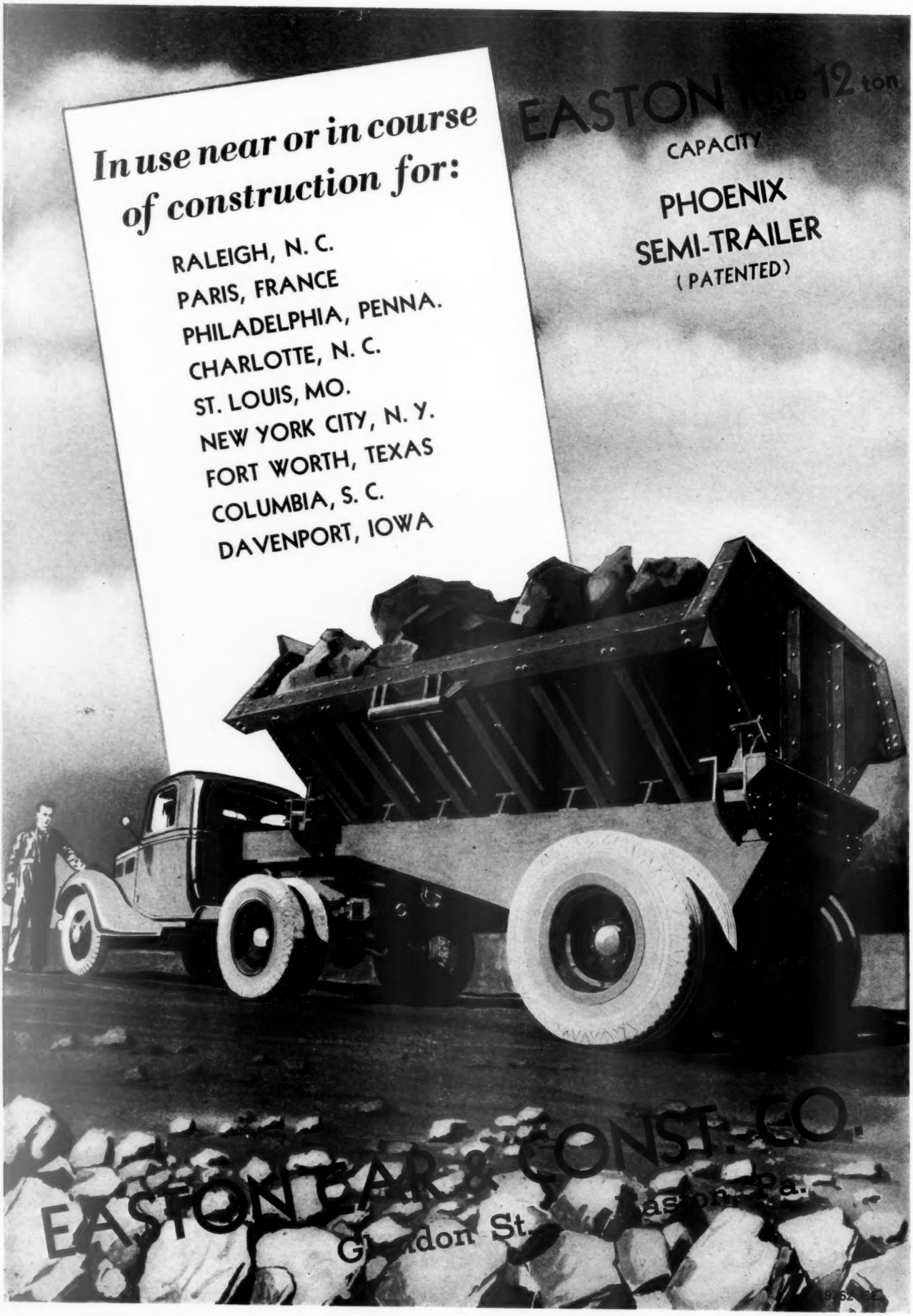
You will always want the toughness of "Flex-Set" Preformed Yellow Strand on your equipment, once you have learned how this toughness saves you money. Try it!

Broderick & Bascom Rope Co., St. Louis

Factories: St. Louis, Seattle, Peoria. *Branches:* New York, Chicago, Seattle, Portland, Houston

V-5R3

"Flex-Set" Preformed Yellow Strand Wire Rope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PHOENIX
SEMI-TRAILER
(PATENTED)
EASTON CAR & CONST. CO.

One of two Bay City Shovels owned and operated by H. M. Jones of Los Angeles.

Action!

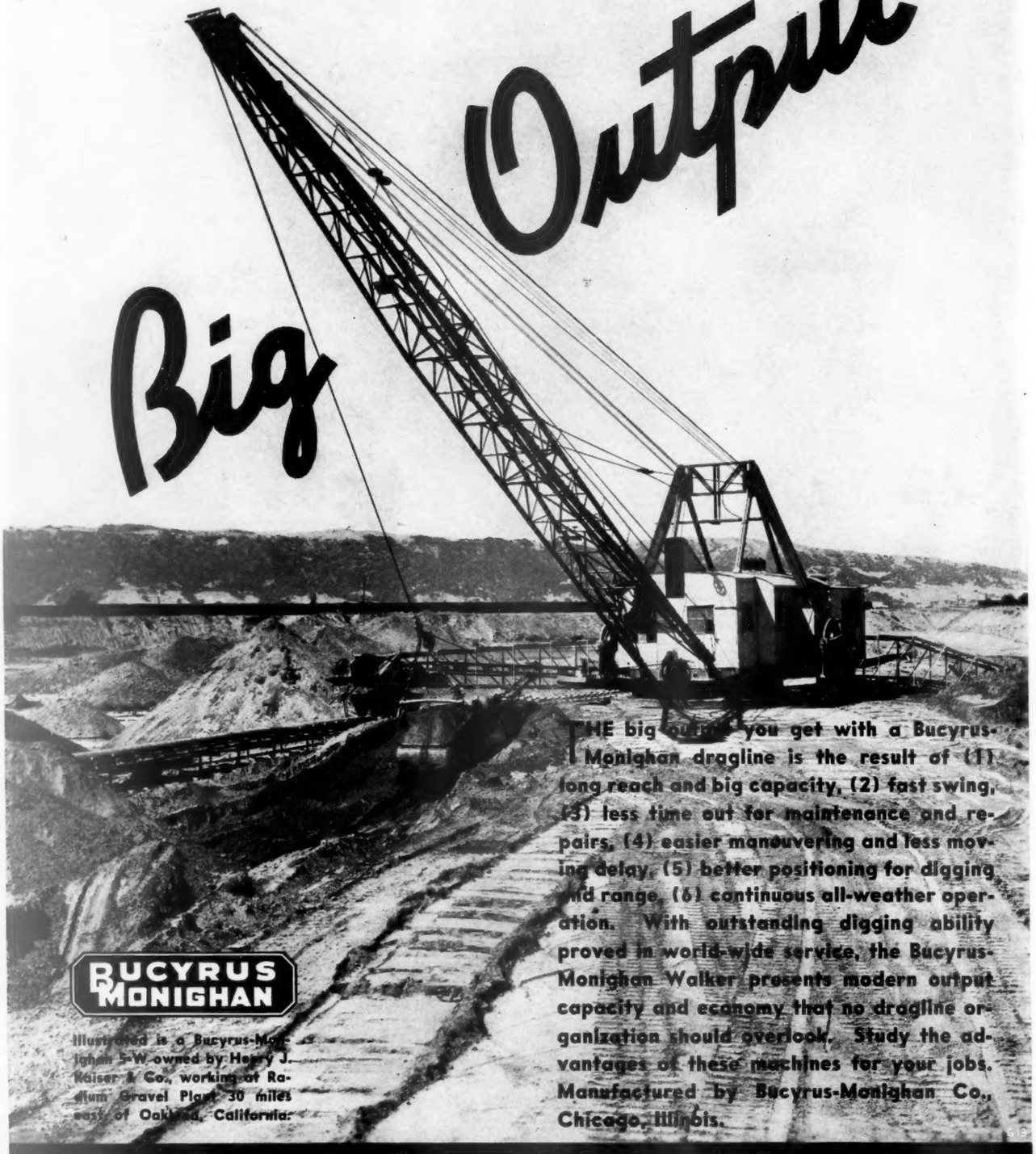
That is what you get when the speed, power and easy operation of standard BAY CITY design is put to work in tough digging. Unit-cast alloy bases • Sturdy one-piece chain crowd • Fast, easy steering and travel • Instantaneous electric dipper trip • Quiet, powerful helical gears • Frictionless bearings throughout • "E-Z" control booster operated clutches—to mention only a few of the many features that insure *greater action* with a BAY CITY *at lower cost*. For complete details and specifications ask for your copy of Catalog H-3.

BAY CITY SHOVELS, Inc., Bay City, Michigan

Export Office: H. M. Hein, 330 W. 42nd St., New York (Oparo)

BAY CITY SHOVELS

Big Output



THE big output you get with a Bucyrus-Monighan dragline is the result of (1) long reach and big capacity, (2) fast swing, (3) less time out for maintenance and repairs, (4) easier manouvering and less moving delay, (5) better positioning for digging and range, (6) continuous all-weather operation. With outstanding digging ability proved in world-wide service, the Bucyrus-Monighan Walker presents modern output capacity and economy that no dragline organization should overlook. Study the advantages of these machines for your jobs. Manufactured by Bucyrus-Monighan Co., Chicago, Illinois.

BUCYRUS MONIGHAN

Illustrated is a Bucyrus-Monighan 5-W owned by Henry J. Kaiser & Co., working at Radium Gravel Plant 30 miles east of Oakland, California.

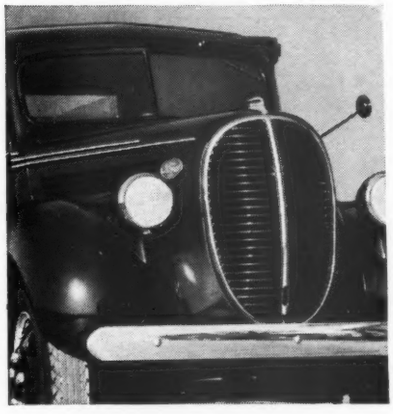
BUCYRUS-MONIGHAN

Sold by: BUCYRUS-ERIE CO., SOUTH MILWAUKEE, WISCONSIN, U. S. A.

"And what, my good man, is a ring gear thrust plate?"

IT'S NO WONDER the duchess doesn't understand. She doesn't drive a truck. But when we mention a ring gear thrust plate to you, we're talking a truck man's language. You recognize it as evidence of the care and study behind Ford rear axle design. And there's a lot more evidence of quality building in every Ford Truck—such features as the V-8 engine, straddle-mounted pinion, needle roller bearing universals, and a score of others. They all add up to quality—and that's the basis of Ford dependability, economy and long life.

CHECK YOUR TRUCK AGAINST THESE QUALITY FORD FEATURES!



V-8 ENGINES—95, 85, 60 HP.—Smooth, dependable, low-cost power. Quality materials and precision workmanship for efficient operation and long life.

SEMI-CENTRIFUGAL CLUTCHES—Non-tiring pedal action. Centrifugal force provides tremendous power-transmitting capacity. Up-keep costs kept at a minimum.

STURDY TROUBLE-FREE TRANSMISSIONS—Large roller and ball bearings for all forward speeds reduce friction, save power. Oil-hardened chromium-steel gears for long service.

FULL TORQUE-TUBE DRIVES—Springs relieved of driving and braking stresses provide better cushioning of truck and its load. Shackle-bolt wear reduced, spring life prolonged.

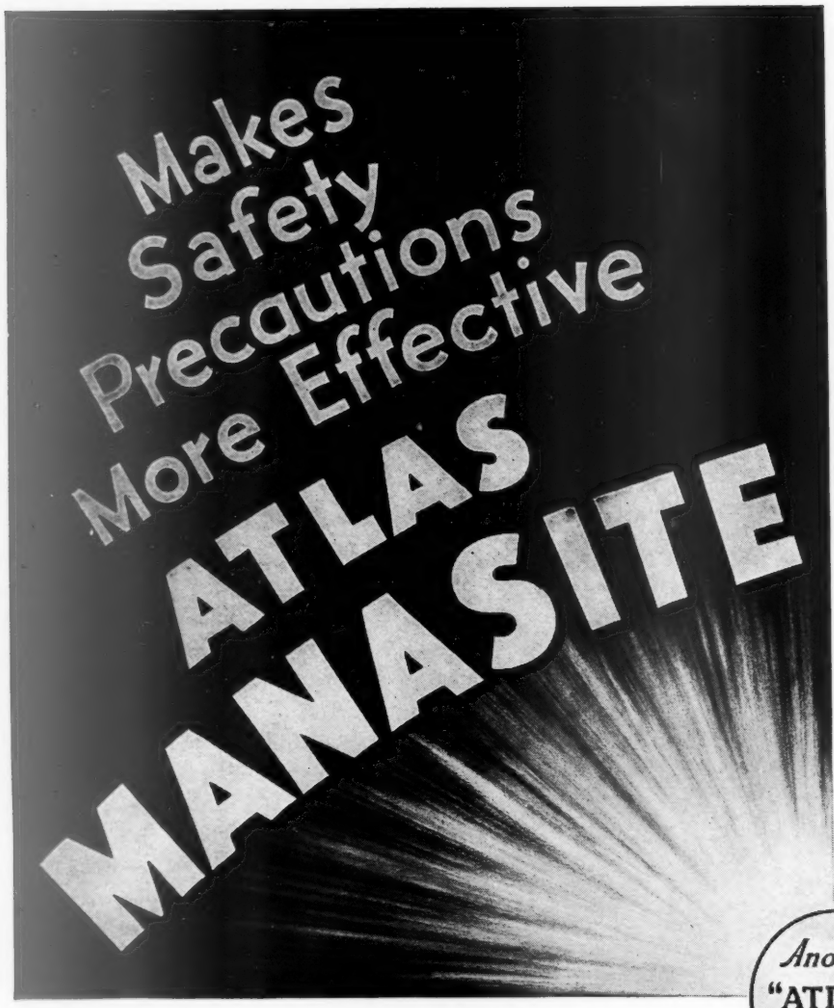
RUGGED REAR AXLES—All driving pinions are straddle-mounted to maintain gear-tooth alignment. All truck axles are full-floating, with weight carried on axle housing—none on axle shafts. These features increase dependability and long service, reduce up-keep expense.

BIG POWERFUL HYDRAULIC BRAKES—Equalized braking action for straight stops. Big brake-drum diameters and large lining areas for long brake life and low-cost maintenance.

• *In every detail, the quality of all Ford bodies matches the high quality of Ford chassis. Their exceptional durability means long service with low up-keep cost.*

FORD V·8 TRUCKS *and Commercial Cars*

Ford Motor Company, Builders of Ford V-8 and Mercury Cars, Ford Trucks, Commercial Cars, Station Wagons and Transit Buses



If your memory of the explosives industry carries back a quarter century or more, you know that Atlas has always been a leader in safety developments. Not only has Atlas constantly urged careful observance of safety precautions, but Atlas Research has contributed more than its share in scientific progress toward greater safety in blasting.

Such a contribution is the Atlas Manasite Detonator—an improvement made possible by an exclusive method of using hexanitromannite. Atlas Manasite Detonators offer materially reduced sensitivity to impact and friction—with no loss whatever in efficiency. They bring a substantial increase in the margin of safety by lessening the possibility of accident through inadvertent mishandling.

Ask your Atlas representative for details.

Another "ATLAS FIRST"

ATLAS MANASITE

Blasting Caps

Accordion Fold Electric Blasting Caps

All-Metal Delay Electric Blasting Caps

ATLAS POWDER COMPANY, WILMINGTON, DEL.

Cable Address—Atpowco

Everything for Blasting

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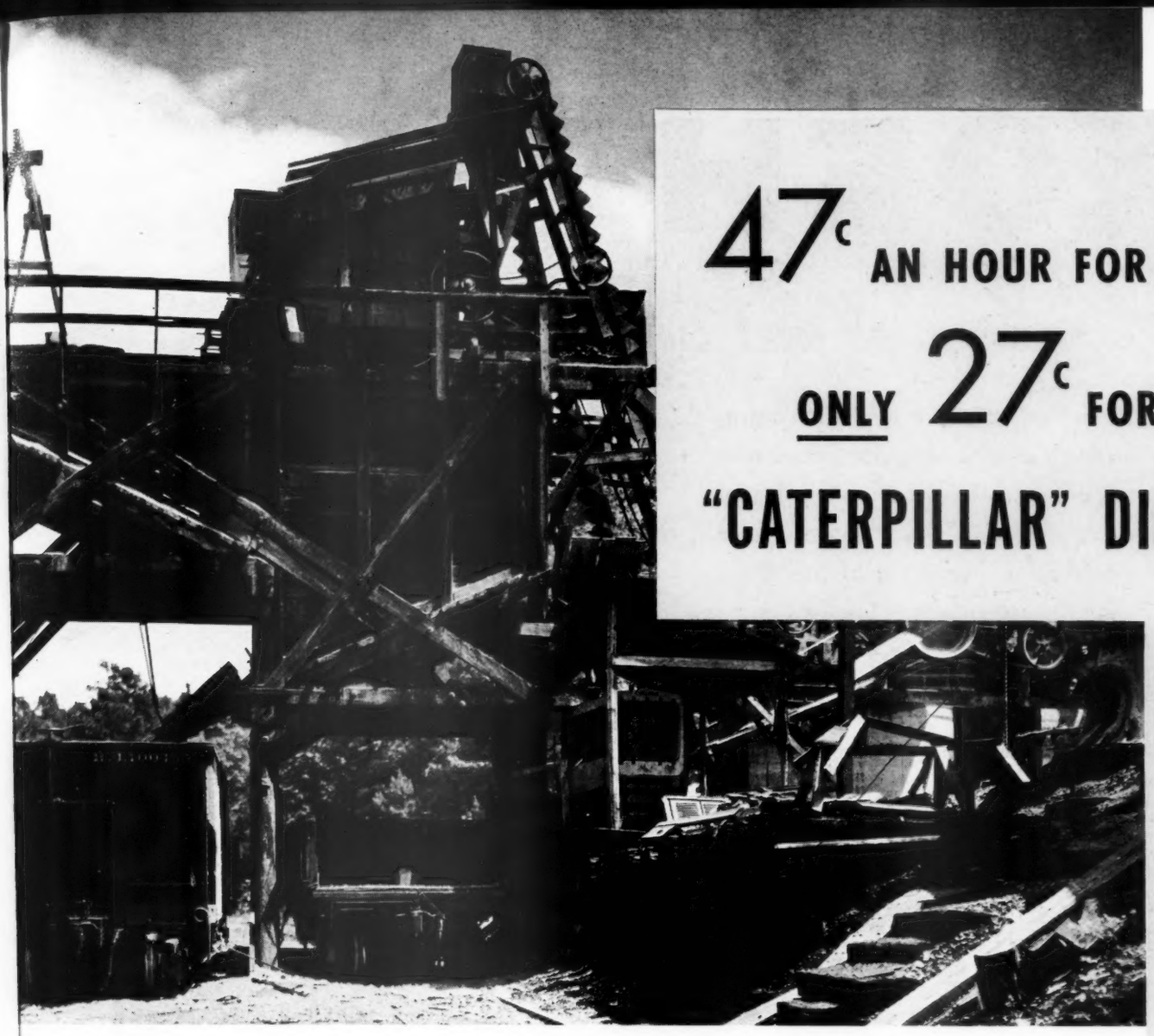
ATLAS

EXPLOSIVES

CHEMICALS ATLAS EXPLOSIVES



47c AN HOUR FOR STEAM

ONLY 27c FOR "CATERPILLAR" DIESEL!

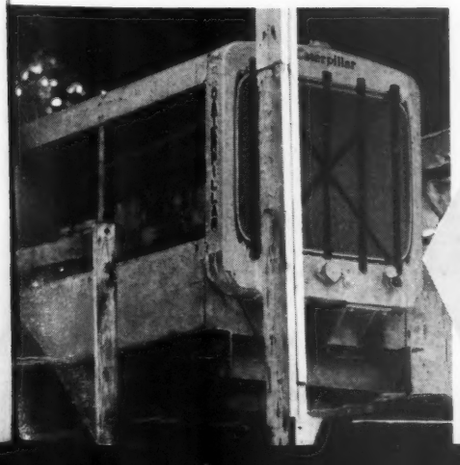
WHEN Walter J. Ehrler shifted from steam to "Caterpillar" Diesel power, for his plant at Butterfield, Arkansas, he started *saving* two dollars a day on fuel! In other words, steam for a 10-hour day, according to reports, cost Mr. Ehrler $4.70. But his 125-horsepower "Caterpillar" Diesel Engine — operating his Universal crusher 10 hours a day, and producing 60 tons an hour — *uses only 30 gallons of 9-cent fuel!*

It doesn't require much figuring to see the direction profits are going to take when they've got power like that behind them. And yet, money-savings on fuel bills are only the *beginning* of "Caterpillar" Diesel savings!

These engines are easy to keep "in tune" — roll along without frequent check-ups and adjustments and nursing from a trained attendant. Precision-built, they can keep right on going — 24 hours a day if necessary; will give you years of useful service in return for normal care and maintenance!

See your nearest "Caterpillar" dealer. He is equipped to show you how the nine sizes of "Caterpillar" Diesel Engines — from 32 to 160 horsepower — can be adapted to all kinds of machinery: crushers, screens, washers, shovels, cranes and locomotives. He can also show you some outstanding records of fuel and maintenance economy made by "Caterpillar" Diesel Tractors!

CATERPILLAR TRACTOR CO., PEORIA, ILL.



CATERPILLAR DIESEL POWER

REG. U.S. PAT. OFF.

DIESEL ENGINES • TRACK-TYPE TRACTORS • ROAD MACHINERY

KOEHRING

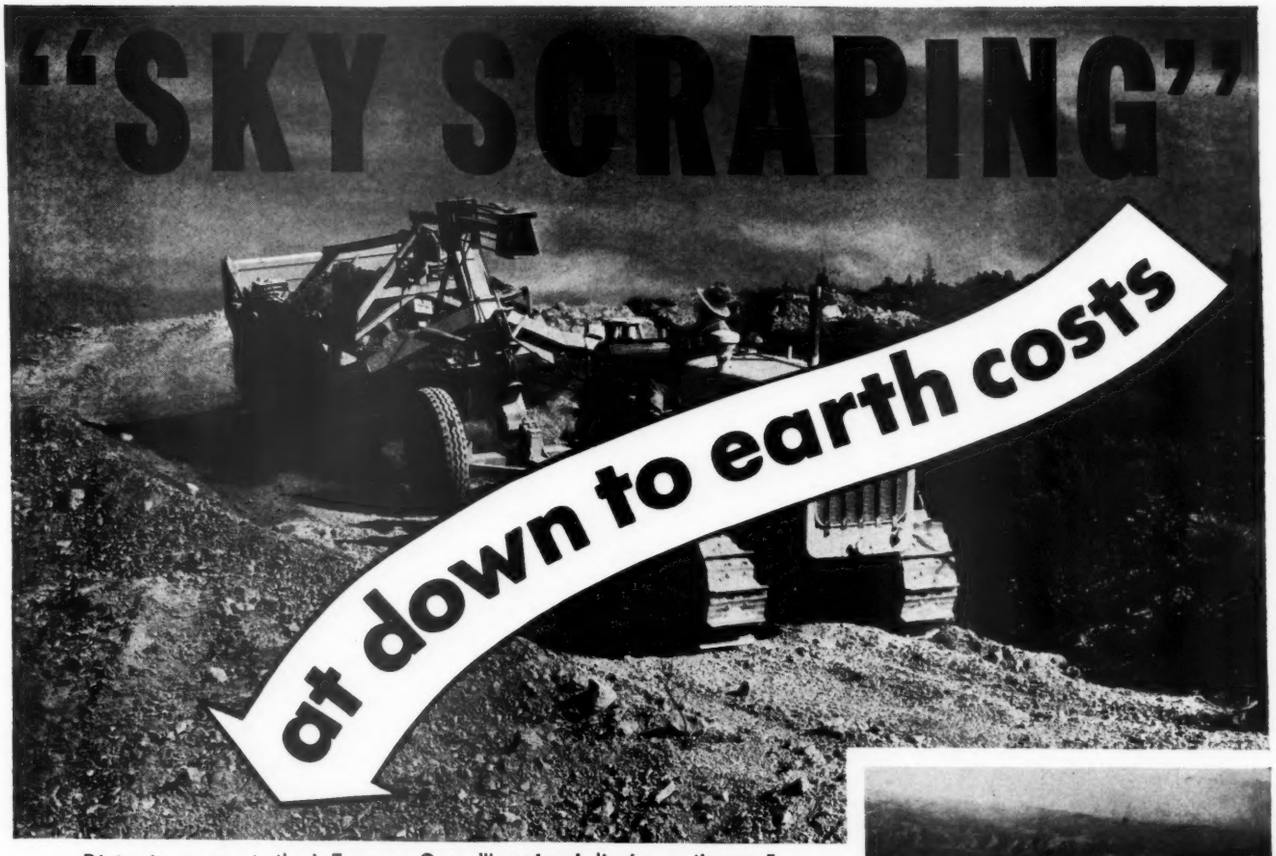
— to get rid of the dirt

. . . whether it is a large stripping shovel, or the smallest basement excavator, the Koehring Shovel advantage of *long reach* and *high lift* "gets rid of the dirt".

. . . crowd the dipper above and beyond the end of the boom . . . because of the Koehring positive and independent crowding action. Maximum power is directly available at any point of dipper travel, whether digging or dumping.

KOEHRING COMPANY

CONSTRUCTION EQUIPMENT • MILWAUKEE, WISCONSIN

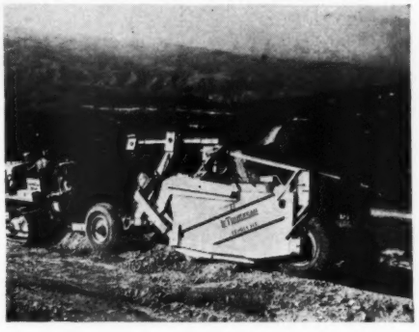


D6 tractor power + the LeTourneau Carryall's ***natural*** digging suction = 5 and more ***pay yards*** of hard, dry clay per trip.

When clay pit stripping takes R. T. Reynolds high onto California's Sierra Peak to work the Claymont property, he makes sure his two worst enemies against profitable operation are licked before he starts. (1) Hard, stubborn digging at (2) power-robbing altitudes are just naturally overcome by LeTourneau Carryall * Scrapers.

Here's where the plow-like penetration of the Carryall blade puts full tractor power into easy, natural digging of sun-baked clay. This, in itself, reduces power demand in any kind of digging . . . gives greater pay loads every trip. Then, the Carryall's light draft, produced by patented box-beam construction of arc-welded special alloy steels, "floated" on plenty of broad-tread pneumatic tires gives "sea-level" performance up in the sky.

The Carryall has no parts at a "premium" to get unusual performance. Even the positive ejector tailgate, that wipes every load from the bowl, independent of the whims of gravity, is found in all Carryalls (from 3 to 30 yards). On this stripping operation, it's dry most of the time.



But when rains come, this clay really hangs to blades and bowls . . . until the ejector polishes it clean in the normal process of dumping.

What we're trying to say is, look for all these features to insure scraper profits over your entire work range. You can put these "plus values" to work on your own jobs at savings that will amaze the most conservative. All we ask is a chance to demonstrate. Phone or see your "Caterpillar" and LeTourneau dealer now! R. G. LeTOURNEAU, INC., Peoria, Illinois; Stockton, California. Cable address: "Bobletorno."

Power Control Units that fit every tractor tool demand, Drag Scrapers, Pushdozers, Sheep's Foot Rollers, Cranes, Treedozers. * Name registered U. S. Pat. Off.

LETOURNEAU
STRIPPING EQUIPMENT

'Dozers with high powerful lift . . . lowest drop.

Rooters* save blasting . . . faster . . . safer.

Carryall* Scrapers from 3 to 30 yards.

PURPLE-STRAND *FORM-SET* WIRE ROPE

3 lubricants scientifically compounded

IN wire rope, proper lubrication of every part is essential to longer life. Only in this way can internal friction be cut down and the closely fitted, precision-made parts protected against corrosion and destructive internal wear.

But ordinary oil or grease cannot serve in heavy-duty rope. Nor could a single type of oil properly lubricate the 100 to 400 moving parts of a line. To overcome these conditions, Bethlehem uses three different lubricants. Each one is specifically compounded for a section of this type of cable. One lubricant keeps the hemp in the core soft and pliable. A second, used for the strands, stays in this compact group of wires and gives them lifetime protection. A third is compounded for the rope as a whole and is built in while the strands are brought together. It serves to seal out moisture and minimize friction between strands as they twist, bend and slide under bending and load.

This special, built-in lubrication is one of many reasons why Purple-Strand Form-Set is so satisfactory in service. A precision method of drawing wire is another. The use of only premium-priced steel is a third. In every detail, Purple-Strand quality is the result of long study, precision design and careful workmanship. Equally important is the fact that every step in the manufacturing process is under the supervision and control of one integrated organization.

BETHLEHEM STEEL COMPANY

WHY A STEAMER IN THE PIT?

HERE'S a place to clip off waste! Why put up with the expense of a watchman in the pit, banking fires, hauling coal and water, drawing fires and blowing down, and all the losses of time due to packing troubles, boiler tube replacement and burned grate bars to say nothing of the inefficiency of an obsolete machine?

With a Northwest gasoline, Diesel, or electric shovel, operating expenses stop when the engine stops. It brings you modern mobility. It brings you a powerful Independent Crowd and additional crowding force that other shovels waste. These are backed by the Northwest boom and no *Northwest* Welded Boom has ever failed. Add to this the Cushion Clutch, the "feather-touch" Clutch Control and other Northwest advantages and your Northwest will pay for itself in output and reduced maintenance. There is a Northwest shovel for every rock and crushed stone problem.

NORTHWEST ENGINEERING CO.
1820 Steger Bldg. 28 East Jackson Blvd.
Chicago, Illinois

A ROCK SHOVEL from Counter-Weight to Boom Tip

GASOLINE • ELECTRIC • DIESEL • OIL

Built in a range of 18 SIZES 3/8 yd. capacity and Larger

NORTHWEST

DU PONT ANNOUNCES A NEW "NITRAMON"

DU PONT
NITRAMON No 2
Known as "NITRAMON" No. 2...
Strength equivalent to 40% ammonia dynamite...Particularly adapted to soft limestone and as a top load for harder material

● A new grade of "Nitramon" is now offered to quarrymen by Du Pont. The new grade is known as "Nitramon" No. 2. It has all the safety advantages of the regular "Nitramon" and is to be used in the same manner as the regular grade.

"Nitramon" No. 2 is slower than the regular grade. It is particularly adapted to soft limestone and as a top load in harder material. Its density is great enough that it will sink in water and has a strength equivalent to 40% ammonia dynamite. It will not produce headache from handling and is non-freezing.

Like the regular grade, "Nitramon" No. 2 is packed in cans. The metal containers simplify loading where large quantities are used. "Nitramon" No. 2 withstands water for an indefinite period, provided the cans remain intact. For full information, just write to: E. I. du Pont de Nemours & Co., Inc., Explosives Department, Wilmington, Delaware.

DU PONT
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NITRAMON

REG. U. S. PAT. OFF.

The Approved Blasting Agent

LUDLOW-SAYLOR WIRE CO.
634 S. Newstead Ave.
St. Louis, Mo.

Please send us Book No. 82.

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Note these points of Quality in

STA-TRU

Long-Slot Woven Wire Screens

STA-TRU screens are specially designed for screening machines with tensioning devices which tend to stretch the crimps in ordinary screens when under load.

The straight stay-bars in STA-TRU have no crimps to stretch. They carry the full load of tension and vibration.

STA-TRU can not be caused to sag or split by the pull of tension members of vibratory screening machines.

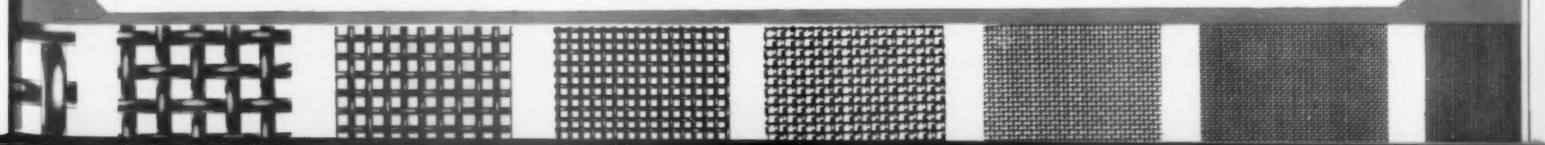
The longitudinal wires in STA-TRU screens are all in one plane between their intersections, so that all the long openings are of uniform width throughout their length.

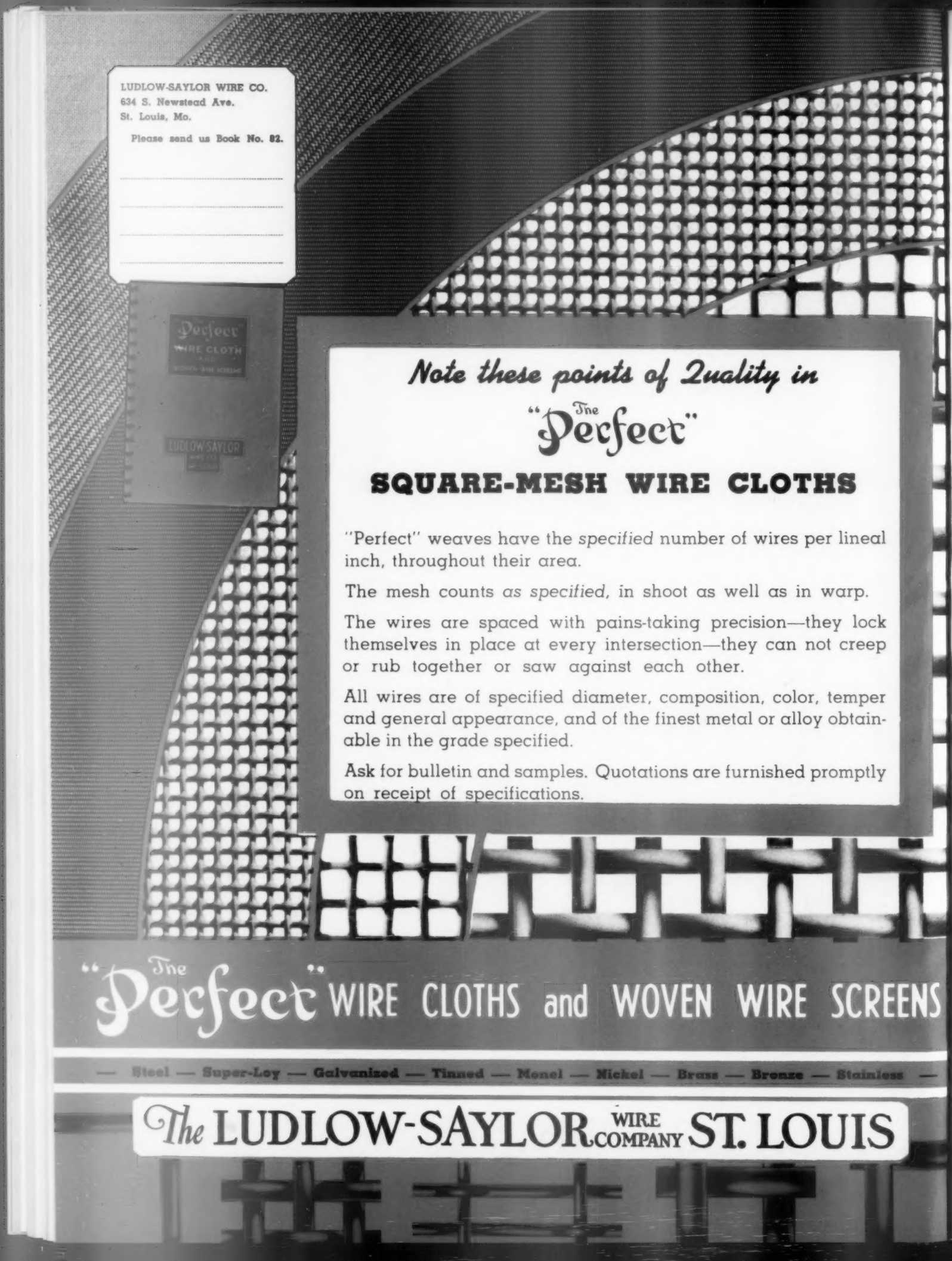
Ask for bulletin and samples. Quotations are furnished promptly on receipt of specifications.

"The Perfect" WIRE CLOTHS and WOVEN WIRE SCREENS

— Steel — Super-Loy — Galvanized — Tinned — Monel — Nickel — Brass — Bronze — Stainless —

The LUDLOW-SAYLOR WIRE COMPANY ST. LOUIS





Note these points of Quality in

"The Perfect"

SQUARE-MESH WIRE CLOTHS

"Perfect" weaves have the *specified* number of wires per lineal inch, throughout their area.

The mesh counts *as specified,* in shoot as well as in warp.

The wires are spaced with pains-taking precision—they lock themselves in place at every intersection—they can not creep or rub together or saw against each other.

All wires are of specified diameter, composition, color, temper and general appearance, and of the finest metal or alloy obtainable in the grade specified.

Ask for bulletin and samples. Quotations are furnished promptly on receipt of specifications.

"The Perfect" WIRE CLOTHS and WOVEN WIRE SCREENS

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COMPANY, INCORPORATED – YORK, PENNSYLVANIA

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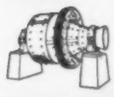
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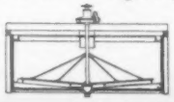
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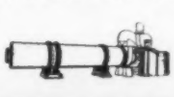
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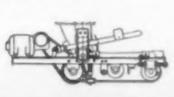
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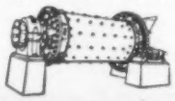

TUBE ROD AND BATCH MILLS

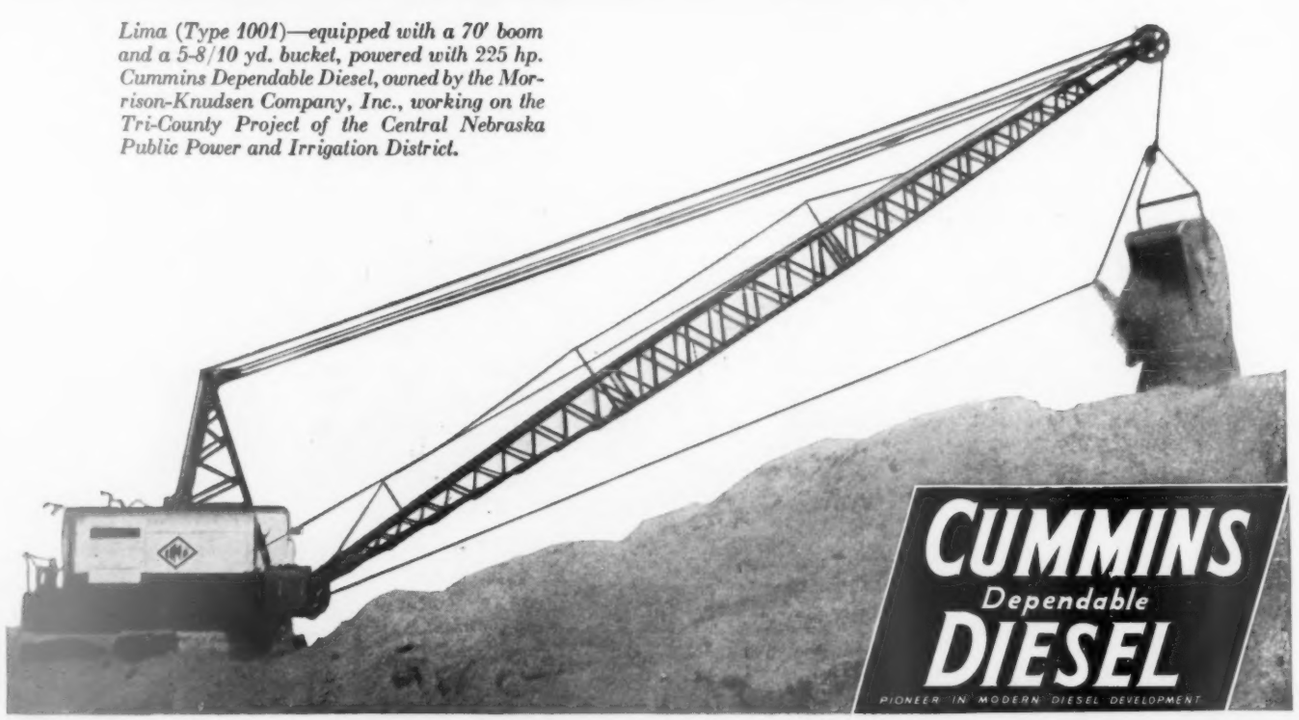
No Three-Cornered Service Problem when you buy CUMMINS dependable Diesel

Whether you buy new equipment powered with Cummins Diesels or re-power your old, you are assured the backing of a national service organization.

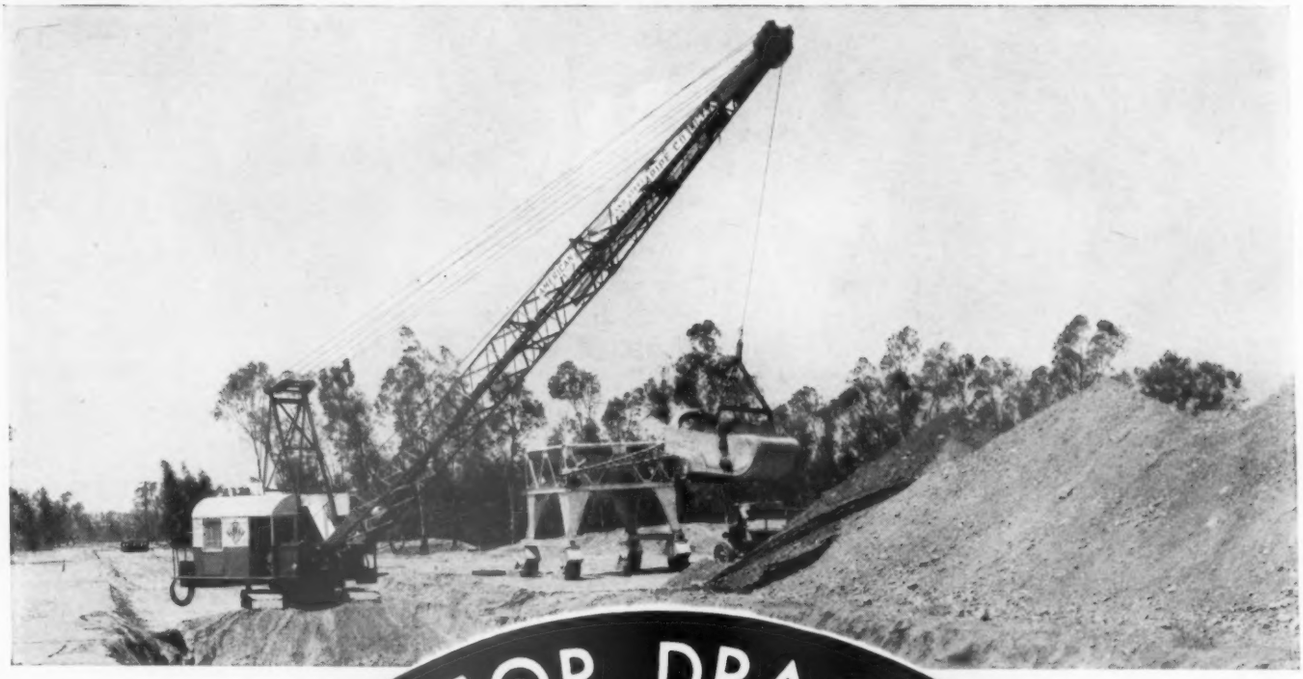
The responsibility for servicing your Cummins Diesel is in the hands of a crew of factory-trained service men and your local Cummins representative—no matter from whom you may have bought your equipment.

This means no divided responsibility—no question whom to call—should accident or emergency demand instant attention. Cummins Engine Company, 3816 Wilson Street, Columbus, Indiana.

Lima (Type 1001)—equipped with a 70' boom and a 5-8/10 yd. bucket, powered with 225 hp. Cummins Dependable Diesel, owned by the Morrison-Knudsen Company, Inc., working on the Tri-County Project of the Central Nebraska Public Power and Irrigation District.



LIMA Dragline, owned by American Concrete & Steel Pipe Co., South Gate, Calif.



A DRAGLINE BUILT FOR DRAGLINE WORK

Economical operation, rugged design and sturdy construction constitute the foundation upon which LIMA has built its reputation as a reliable, trouble-free and long lived dragline. LIMA excavators have been proved and accepted by leading contractors everywhere who demand big output and low cost operation. Their oversize construction and abundance of power makes it possible to produce big yardage at low cost. For long dependable service and greater profits, use LIMA excavators.

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GILMORE WIRE ROPE

More Economy in Cost

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One Special point about Gilmore Precisionbilt Wire Rope all users appreciate is the added service it invariably gives when subjected to hard . . . oppressively hard service usually occasioned in mines and quarries, excavating and road work.

This naturally reduces the cost—because after all you don't buy Wire Rope—you only buy service.

The price of Wire Rope of all makes is practically the same—but do you always get what you pay for? That's why we wish to prevail upon you to try Gilmore Precisionbilt Wire Rope the next time. Try it in comparison with what you now use. Buy it with the expectation of getting longer and much more satisfactory service—you'll find it has paid you well to use ropes built with precision in a modern plant. There's quite a difference—you'll notice it. Try one.

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GILMORE WIRE ROPE DIVISION

MUNCY · PENNSYLVANIA

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ECONOMY COMES IN A 'TUBE'

REPUBLIC BUILDS AN AIR HOSE OF RUGGED CONSTRUCTION FOR A TOUGH JOB

● Conditions encountered in pneumatic tool work make the maintenance of air hose a costly proposition. In answer to the expense for air hose upkeep, Republic offers a tube of economy in Tower Pneumatic Hose. This tube of carefully compounded rubber inside of a strong, resilient cord body is recognized for the noticeable decrease in operating costs it affords.

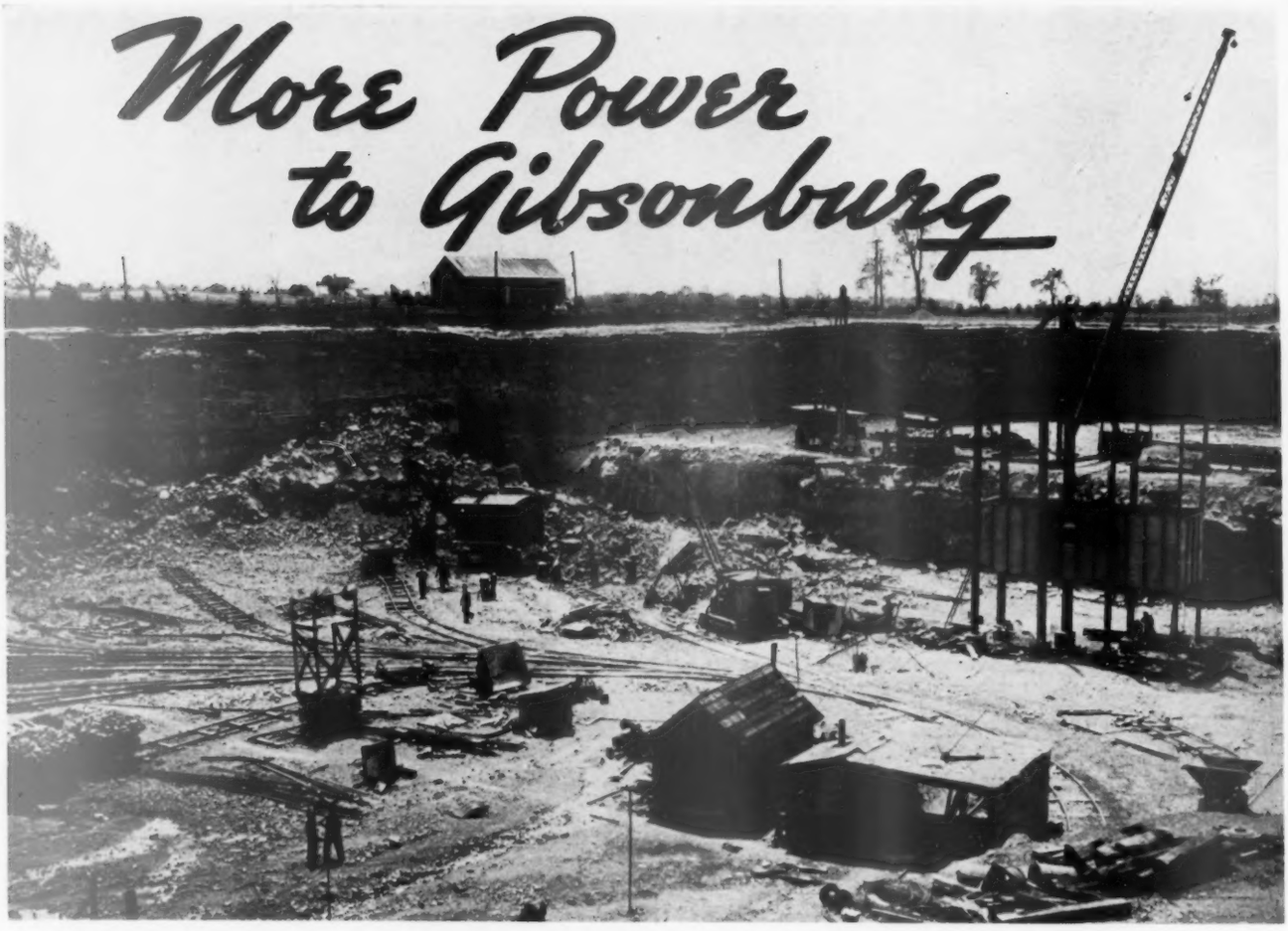
Applications on air drills, hammers, tampers, drivers and other pneumatic hose service have proved the strength and ruggedness of Tower's construction. The smooth inner tube has the desireable features of that used in oil-conducting hose . . . in addition to heat-resistant properties. Multiple braids of tightly twisted cords set in pairs afford a strong yet resilient carcass. Shock and abuse are resisted by the special braid construction and rubber compound which impregnates the plies and bonds them together. And finally, the characteristic tough brown cover provides protection against abrasion, cutting action of sharp rock, exposure to sun and other deteriorating elements.

All the facilities for research and experiment which were put to work to develop this pneumatic hose economy are utilized in the manufacture of Republic Hose, Belting, Packing or Molded Rubber Goods. Republic Rubber Division of Lee Rubber and Tire Corporation, Youngstown, Ohio.

ORDER REPUBLIC RUBBER PRODUCTS FROM YOUR DISTRIBUTOR

REPUBLIC RUBBER

HOSE • BELTING • PACKING • MOLDED PRODUCTS



...AND MORE IMPORTANT—CHEAPER POWER

● The 8 cylinder 12½ x 16½, 615 hp SUPERIOR DIESEL that the Gibsonburg Lime Products Company, of Gibsonburg, Ohio, has just purchased will give them the low cost power so desirable in quarries and rock crushing plants today.

This same economy is likewise available to you. Let our engineers analyze your problem; their service is free.

THE NATIONAL SUPPLY COMPANY . . . SUPERIOR ENGINE DIVISION

FACTORIES: Springfield, Ohio; Philadelphia, Pa. · SALES OFFICES: Springfield, Ohio; Philadelphia, Pa.; New York, N. Y.; Los Angeles, Calif.; Houston, Texas.

MEN LIKE THESE

...*now* put the BUCKET LOADER *First* as a method of handling aggregates

Cost per yard handled is the measuring stick! They know the volume of orders and stockpiled yardage to be loaded is mounting with every month's statistical report. They know the depression-idea of buying multi-purpose machines is wasteful today—for a Bucket Loader will outdig and out-load a turntable swing machine twice over, and cost not much more than half as much.

Loading's a job for a Loader in these days. A most efficient machine for its special purpose. Ask the man who has bought a Haiss.

4 Great Haiss Loaders

FOR HEAVY DUTY

MODEL "135"
with a capacity of 5 to 8 yards a minute.

MODEL "80"
The second big machine, 3 to 5 yds. a minute.

MODEL "27"
The general purpose Loader with a 2 to 3 yd. capacity and weight and power for heavy digging.

FOR STOCKPILES

MODEL "75"
The Stockpile Loader with 3 yd. capacity, at a popular price.

HAISS LOADERS

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A. N. FARNHAM, INC. New Haven, Conn.
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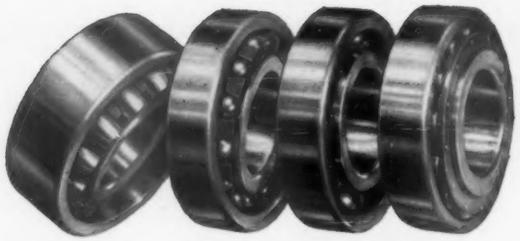
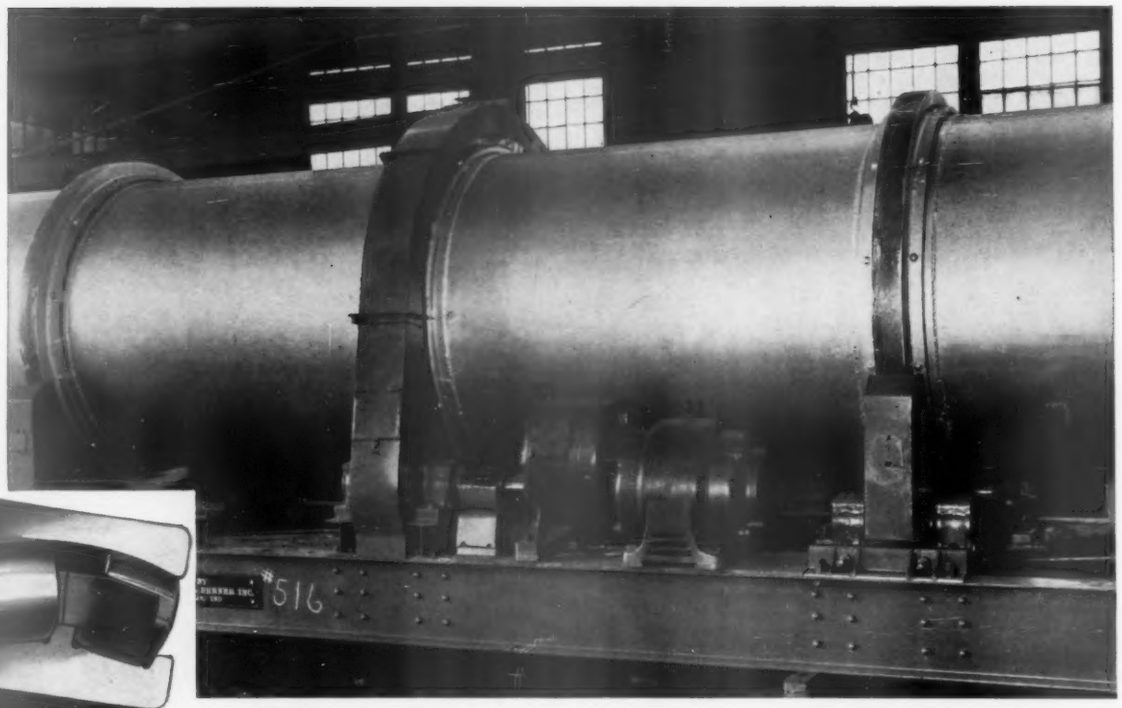
GEORGE HAISS MANUFACTURING COMPANY, INC.

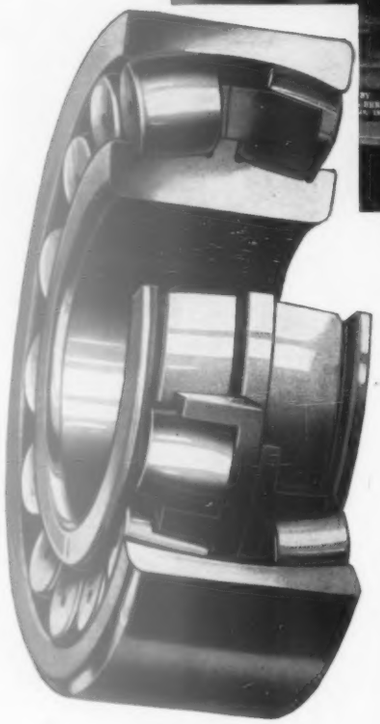
142nd STREET & RIDER AVENUE, NEW YORK, N. Y.



WEAR KEEPS AWAY FROM DRYER DRIVES THAT RUN ON SKF BEARINGS



● SKF-equipped connecting drive geared-head motor and pinion gear driving sand and gravel dryer. Built by Hetherington & Berner, Inc.



SKF BEARINGS AVOID WEAR AFTER YEARS OF HARD SERVICE ON TOUGH JOBS IN AN ABRASIVE ATMOSPHERE

● Wherever there's dust and dirt to bite into shafts . . . wherever there's moisture to cause rust . . . there's WEAR in the rock products industry.

So Hetherington & Berner, with the wisdom of long experience and with faith in a famous symbol, mounted the drive of this sand and gravel dryer on SKF Bearings and Pillow Blocks. They checked WEAR before it had a chance to destroy.

Efficiently sealed against dust, dirt and moisture, SKF Bearings help the geared-head 25 h.p. motor and pinion gear drive this dryer at 11 r.p.m. . . . and they do it despite the dust, grit, and dirt in which this machine works.

In an SKF Bearing hardly any WEAR is noticeable even after long periods of hard service, and the WEAR is never enough to affect the efficiency of the bearing.

Perhaps *you* need a long-lasting bearing with self-aligning characteristics to allow for shaft deflections without cramping . . . a carefree, compact bearing with the capacity to take all kinds of loads all the time. If you do, specify SKF.

4286

SKF
Ball and Roller Bearings

SKF INDUSTRIES, INC., FRONT ST. & ERIE AVE., PHILA., PA.

MARION

CRANES • DRAGLINES SHOVELS • CLAMSHELLS PULL SHOVELS

ASK ANY OWNER

He will tell you the NEW • MODERN MARIONS are the fastest machines on crawlers

FAST

When you buy a Marion . . . you buy a proven machine of modern design . . . sturdy construction . . . proper balance . . . maximum stability . . . plenty of power . . . lots of speed . . . an excavator that is built with modern day digging and material handling requirements in mind. Make your next machine a MARION . . . and you will make yourself some real money. ●

THE MARION STEAM SHOVEL CO., MARION, OHIO, U. S. A.

SEND for bulletins describing the size and type of Marion you need. Also ask to be put on the mailing list to receive THE GROUNDHOG

MODERNIZE with MARIONS FROM ¾ CU. YARDS UP

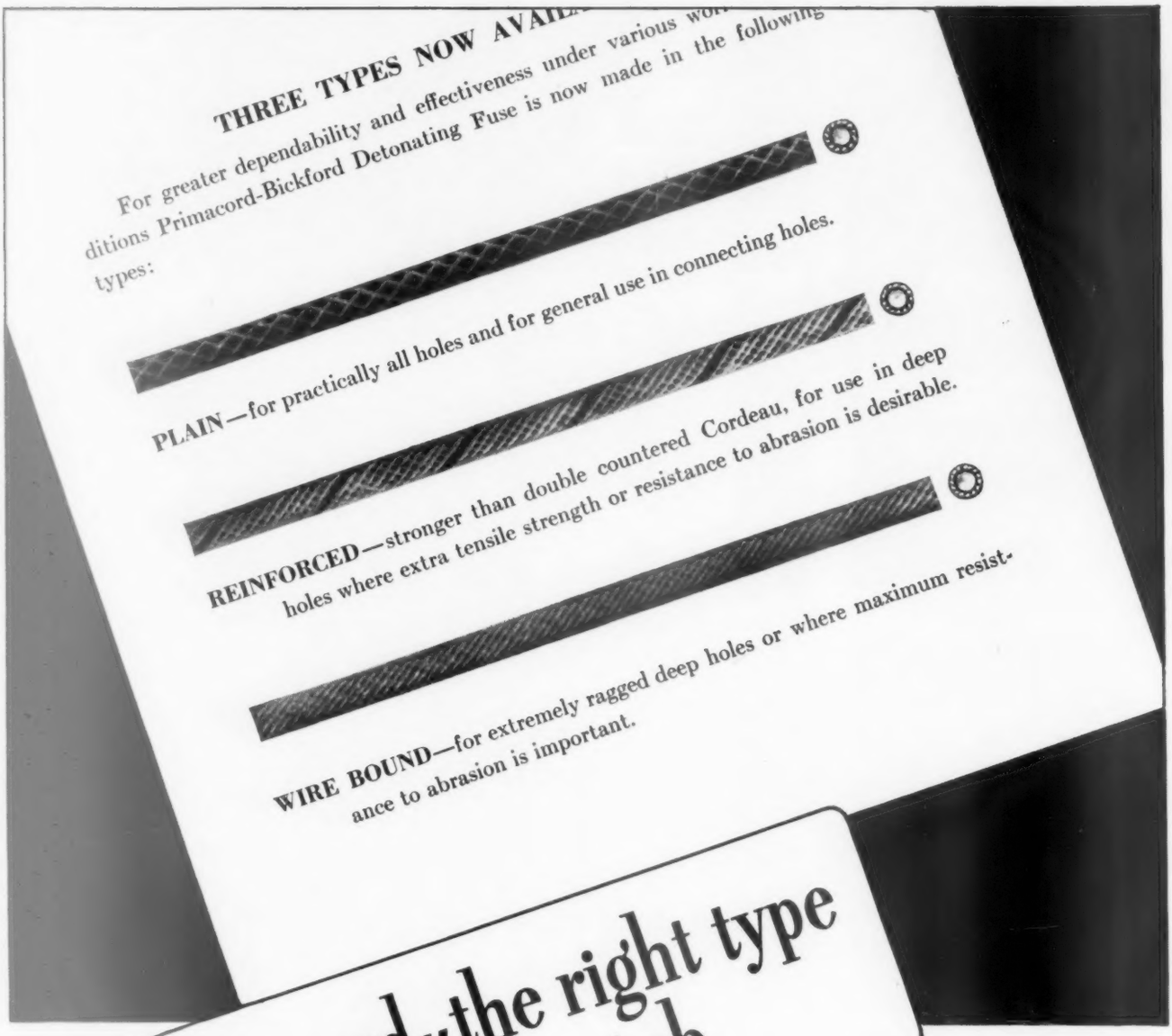
STURDY

THOMAS A. BROGAN, Yonkers, N. Y. A Modern Marion Type 362—Diesel—1½ cubic yard Shovel used on general construction work. » » »

ALUMINUM COMPANY of AMERICA Pittsburgh, Pa.—A Modern Marion Diesel Crane is being used by this company at its Mobile, Alabama plant.

TANGREDI & HESS, Inc., Bronx, N. Y. Marion Type 362—working in rock on an excavating job and giving an excellent account of itself. » » »

UTAH CONSTRUCTION COMPANY Ogden Utah.—A Modern Marion Type 40-A dragline loading slag near Salt Lake City. » » » »


THREE TYPES NOW AVAIL
For greater dependability and effectiveness under various wor
ditions Primacord-Bickford Detonating Fuse is now made in the following
types:
PLAIN—for practically all holes and for general use in connecting holes.
REINFORCED—stronger than double countered Cordeau, for use in deep
holes where extra tensile strength or resistance to abrasion is desirable.
WIRE BOUND—for extremely ragged deep holes or where maximum resist-
ance to abrasion is important.

Primacord—the right type for every job

Primacord-Bickford, the new insensitive detonating fuse, is made in these three types to meet every demand of an instantaneous blasting fuse.

Write for the free Primacord Booklet and complete information on this improved detonating fuse. THE ENSIGN-BICKFORD COMPANY, Simsbury, Conn., U.S.A. *Makers of Cordeau-Bickford Detonating Fuse —and Safety Fuse Since 1836.*

PRIMACORD·BICKFORD *Detonating Fuse*

PB6

Prevent WIRE ROPE Corrosion!

Proper wire rope lubrication prevents corrosion—maintains rope safety—lengthens rope life—reduces wear—saves money

CORROSION is one of wire rope's greatest enemies. Unchecked, it will greatly shorten the useful life of a wire rope. It can easily reduce the safety of a wire rope to a point where further use of the rope is hazardous. Yet, to the eye, the rope may appear only slightly rusty—most of the damaging corrosion may be confined to the hidden inner wires.

The first detrimental effect of corrosion is microscopic pitting—unseen to the naked eye. But it results in early wire breakage.

As the corrosion makes headway it becomes visible. It binds the wires—prevents their free movement, one against the other. The rope loses elasticity. Individual wires break. Ability to absorb impact and sudden shock becomes a gamble.

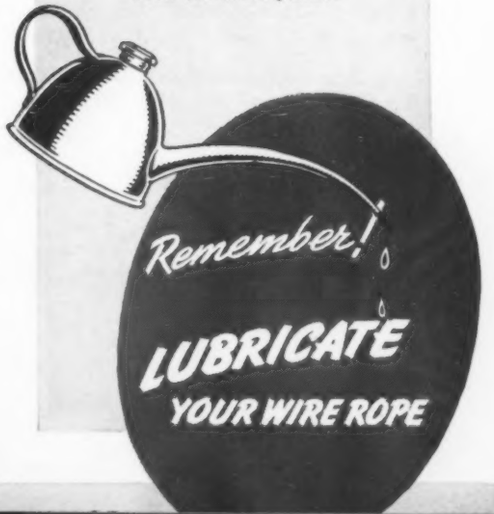
No wire rope can be furnished with enough lubricant to last a lifetime. Therefore, to prevent corrosion—to assure safety:

(1) Lubricate your wire ropes regularly; (2) with a lubricant especially made for wire rope application; (3) and suited to your own individual operating conditions.

This advertisement is published in the interest of all wire rope users, to help them obtain greater safety, service and efficiency from their wire rope.

For advice on wire rope lubrication

FOR further information regarding the proper lubrication of your wire ropes, consult the nearest Roebling branch office or our main office, Trenton. New Jersey.



JOHN A. ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY BRANCHES IN PRINCIPAL CITIES

COTTRELL
Gas Cleaning: ONE PRINCIPLE— UNIVERSAL APPLICATIONS

FOR TOUGH JOBS NOTHING ELSE CAN HANDLE

1. Billions of cubic feet of all kinds of manufactured fuel gas are being de-tarred **every day** by Cottrells; reducing back pressure throughout entire system, lowering labor and material costs in purifying and eliminating trouble in burners and apparatus.

2. Millions of cubic feet of smelter and hot roaster gas are being cleaned **every minute** in individual installations, with the recovery of metallic and other values that make the equipment self-supporting or highly profitable.

3. Billions of pounds of cement dust have been collected by the first Cottrell installed in this industry twenty-five years ago. The installation is still in successful operation without major alterations.

4. Fly ash from over a hundred pulverized coal fired boilers is being removed by Cottrells.

5. Over twenty installations of Cottrells are cleaning iron blast furnace gas.

NOTE THESE ADVANTAGES . . .

1. Efficiencies up to 99.99 per cent or over and at atmospheric or highly elevated temperatures.

2. Power consumption ranges from 0.5 to 1.0 kilowatts per hundred thousand cu. feet of gas cleaned.

3. In most cases the pressure drop is only a few tenths of an inch of water.

4. Cottrells are guaranteed to the desired efficiency on the basis of ***total*** solids entering the collector, ***irrespective of particle size or nature and with no strings on lower micron brackets.***

5. Cottrells are made in small sizes as well as large. Some assemblies are completely self-contained, and are shipped ready for the foundations.

General and Specific Bulletins available for all industries.

WESTERN PRECIPITATION CORPORATION
1016 W 9th ST . LOS ANGELES, CALIF

RESEARCH CORPORATION
405 LEXINGTON AVENUE
NEW YORK CITY, N. Y.

PIONEERS IN DUST AND FUME CONTROL

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PIT AND QUARRY

Vol. 31 March, 1939 No. 9

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PIT AND QUARRY

CHICAGO MARCH, 1939

Explosion Kills Two at Colorado Cement Mill

BUILDINGS SERIOUSLY DAMAGED

Two workmen were killed and a score of others escaped serious injury in an explosion at the plant of the Colorado Portland Cement Co., near Fort Collins, Colo., on January 30.

The explosion, caused when a large quantity of blasting dynamite was being thawed out in the plant garage, destroyed that building, part of the plant office structure, and damaged one wall of the main plant structure so badly that it was feared for a time that the building would collapse.

The plant, erected 13 years ago, was built at a cost of $2,775,000.

Several automobiles in the garage, owned by employees, were destroyed by the explosion and it was in attempting to save their own cars that the two workmen, Dudley Tremaine and Lorenz Saracino, were killed.

The terrific blast came five minutes after the loaded dynamite, left near a small stove to thaw, caught fire from a stove.

The belief that frozen dynamite could burn without exploding was so general among the plant employees that the victims did not hesitate to enter the garage to remove their machines from the fire area.

Cement Workers Gather for Union Conference

A three-day meeting of eastern locals of the United Cement Workers was held a short time ago at Bath, Pa.

Delegates were present from Martin's Creek, Ormrod, Nazareth, Coplay, Fogelsville, Stockertown, Evansville, Valley Forge and Bath, Pa., Catskill, Hudson, N. Y., and New Village, N. J.

Arthur J. Strunk, chairman of the Lehigh Valley Cement Conference Board, was in charge of the gathering. Contracts which are being negotiated by Organizer Samuel Diskan with the cement manufacturers of the eastern part of the United States were discussed.

Lewis G. Hines, new secretary of labor and industry of Pennsylvania, was a guest speaker.

Antonio Gallo, of LaSalle, Ill., general secretary-treasurer of the United Cement Workers, also made an address.

Indict New York Firms on Concrete-Pipe Sales

After 14 months of investigation, a grand jury at Buffalo, N. Y., has returned indictments naming six individuals and five corporations in an alleged conspiracy to defraud the city of Buffalo of from $150,000 to $200,000 in the sale of concrete sewer pipe.

Among those indicted were: the Great Lakes Concrete Co. and its president, Earl J. Sherwood; the Albany Gravel Co., Albany, N. Y.; Universal Pipe Co., Rochester, N. Y.; and the New York Concrete Co., Warsaw, N. Y.

Chadwick Resigns from Standard Silica Corp.

F. C. Chadwick, vice-president and general manager of the Standard Silica Corp., Ottawa, Ill., has severed his connection with the firm after having had charge of the company's operations for 16 years. Mr. and Mrs. Chadwick have gone to Florida where they will remain until spring before he announces his plans for the future.

Ohio Cement Firm Is Seeking to Reorganize

Reorganization of the Superior Cement Co., Portsmouth, O., whose plant was formerly operated by the now defunct Wellston Iron Furnace Co., is sought under Section 77-B of the Federal bankruptcy act in a petition recently filed in the U. S. District Court at Wellston, O.

ASTM Meeting Will Feature Lime Topics

LIST SEVEN TECHNICAL PAPERS

Two technical symposia, one on thermal insulating materials, the other on lime, will feature the 1939 Regional Meeting of the American Society for Testing Materials to be held at the Deshler-Wallick Hotel in Columbus, O., March 8. These sessions are being held during A.S.T.M. committee week, March 6 to 10, inclusive, during which a large number of standing committees of the society will hold their annual spring group sessions.

The symposium on lime, to be held on Wednesday morning, March 8, is being sponsored by Committee C-7 on Lime. Four of the members: Prof. J. R. Withrow, chairman, professor of chemical engineering, Ohio State University; J. W. Stockett, Jr., secretary, National Lime Assn.; L. E. Johnson, secretary and general manager, Finishing Lime Assn. of Ohio, and F. O. Anderegg, consulting specialist on building materials, Owens-Corning Fiberglas Corp., have been directly responsible. J. C. Pearson, Director of Research, Lehigh Portland Cement Co., has represented the A.S.T.M. Papers Committee on the lime-symposium committee.

A number of technical papers are being included as follows:

Factors Affecting Milks of Lime Employed in Industry—D. E. Washburn

Hydration of Magnesian Lime and the Autoclave Test—F. C. Welch

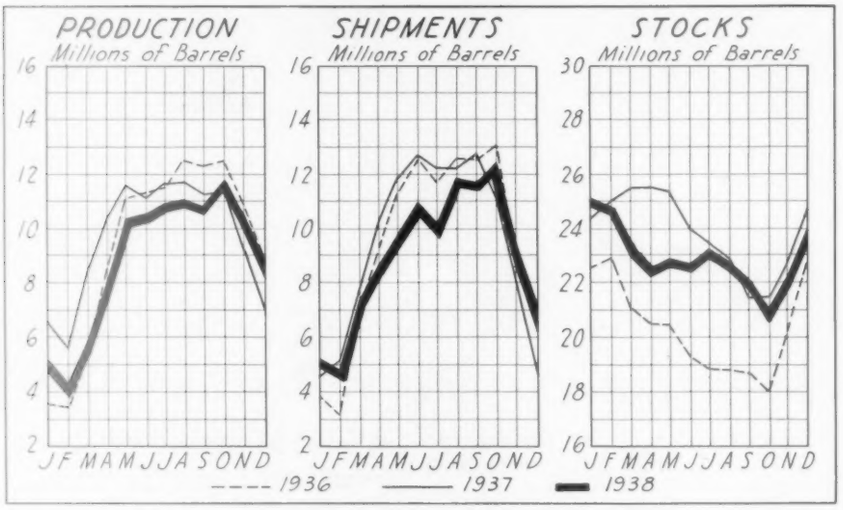
Lime Characteristics and Their Effect on Construction—Walter C. Voss

Manufacturing Lime for the Glass Industry—A. H. Nieman

Variations in Properties of Dolomitic Lime Putties with Methods of Hydration—John E. Conley

Preliminary Investigation of the Determination of Fluorine in Lime—C. J. Koehler

The Basis of Standards for Lime for the Soil, Up to Date—E. O. Fippin



The Portland-cement industry in December, 1938, produced 8,066,000 bbl., shipped 6,281,000 bbl. from the mills, and had in stock at the end of the month 23,964,000 bbl., according to the Bureau of Mines. Production and shipments of Portland cement in December, 1938, showed increases of 14.5 and 31.0 per cent., respectively, as compared with December, 1937. Portland-cement stocks at mills were 3.9 per cent. lower than a year ago. The preliminary totals show production for 1938 to have reached 105,548,000 bbl., a decline of 9.1 per cent. from the 116,478,000 bbl. in 1937. Shipments for 1938 were 106,524,000 bbl., down 6.4 per cent. from the 114,010,000 bbl. in 1937. According to the U. S. Bureau of Mines the industry utilized 41.0 per cent. of its capacity in 1938 compared with 45.3 per cent. in 1937.

To Build Branch Plant at Zanesville, Ohio

Plans for construction of a branch plant in Zanesville, Ohio, were announced February 10 by H. Eschenbrenner, president of the Universal Concrete Pipe Co., Columbus, O. The new branch would put the company in a position to serve Zanesville in its huge sewer project, bids on which were recently given.

I. A. Heinzman, general manager of the Columbus plant, visited the city to obtain a suitable site for the proposed plant. Details concerning the size and capacity of the new branch were not disclosed.

Block Plant's Capacity Nearly 25,000 per Day

The Currier Lumber Co., Detroit, Mich., has begun the manufacture of cement blocks at what is said to be one of the largest and most modern plants in the middle west.

The plant's capacity is said to be between 20,000 and 25,000 blocks per day. It has six large curing kilns, and there is also an undercover storage building with a capacity for 1,000,000 blocks.

"For more than a year, our firm has been experimenting with the possibilities of making superior cement blocks," according to Don Currier, vice-president of the company.

"We finally decided to erect a plant where we could manufacture building blocks of uniformly high quality and could produce them in large enough quantities to give them adequate time for proper seasoning and drying.

"Scientific design of the plant building and modern equipment enable us to overcome difficulties of the so-called 'green' cement block.

"Every part of the plant's 30,000 sq. ft. of floor space will be used either in production and curing. Aggregates enter the plant by railway car or truck on the south side. From here they are elevated to the third floor where they are automatically weighed and mixed in proper proportions before being lowered to the block machines on the ground floor."

Harry Currier is manager of the new plant. Harry Ludwig was the construction engineer.

Indiana Stone Concern Enlarges Its Plant

The Hansbarger Stone Co., West Franklin, Ind., is now operating its new, enlarged plant in a new location in the West Franklin quarry field.

The new plant has a capacity of 150 tons of crushed limestone per day. T. M. Hansbarger is general manager.

New Ready-Mix Operator Enters Marion Market

A new ready-mixed-concrete concern, the Marion Ready-Mixed Concrete Co., Marion, Ind., has started operating.

Lawrence Harris is the head of the concern.

Lime Shipments Down 17 Per Cent. in 1938

AVERAGE VALUE ALSO LOWER

Shipments of lime in 1938 in the United States, according to preliminary figures furnished the Bureau of Mines by producers, decreased approximately 17 per cent. compared with 1937. The total sales indicated amounted to 3,424,000 short tons valued at $24,153,000.

Following the general trend of most industries in 1938, the demand for lime was poor during the first eight or nine months of the year. Increased activity in the chemical metallurgical and building industries in the latter part of the year created a more active demand for lime, but the increase in sales during this period was insufficient to make the total for 1938 equal to that of 1937. Few companies reported a higher production in 1938 than in 1937, and Indiana and Tennessee are the only states for which any noteworthy increase is indicated.

Lime sold for construction, estimated at 887,000 tons valued at $7,385,000, decreased about 7 per cent. in quantity and 10 per cent. in value. The decline in sales for building purposes was less than for other major uses. Sales for agricultural purposes amounted to 356,000 tons valued at $2,397,000, a decrease of 12 per cent. in quantity and 13 per cent. in value. So-called "chemical" lime (exclusive of dead-burned dolomite)—used in the chemical, metallurgical, and other process industries—amounted to 1,824,000 tons valued at $11,390,000. This represents a decrease of 15 per cent. in quantity and 18 per cent. in value from 1937. Over one-half of all the lime sold was included in this classification. Shipments of dead-burned dolomite suffered the greatest decline in 1938 compared with 1937—42 per cent. in quantity and 43 per cent. in value. Based on reports received the quantity estimated is 357,000 and the value $2,981,000. Ohio with an output of 242,000 tons valued at $2,098,000 was the largest producer of this material.

Prices throughout the country were about the same or slightly lower than in 1937. The average value reported for 1938 was $7.05 per ton compared with $7.30 in 1937.

Hydrated lime included in the total amounted to 1,092,000 tons valued at $8,640,000, a decrease of 16 per cent. in both quantity and value. About one-half of the hydrated lime is used by the building trades, one-third for chemicals and the remainder for agriculture.

The Sierra Minerals Co. has completed the erection of a new mica-schist plant near LeGrand, Cal.

Survey Predicts Gain for Cement Industry

EARNINGS EXPECTED TO RISE

The Standard Statistics Co., New York, N. Y., has released a survey which predicts greater business and earnings in the cement manufacturing industry for 1939. The statistics company declared that the combination of a wide increase in shipments, not much rise in costs and the possibility of some check on foreign competition promises better earnings for the cement industry this year than last year, even if actual prices remain low.

It was shown that cement shipments in the final quarter of 1938 were up 10 to 12 per cent. from 1937. On the basis of the survey, it was forecast that the year-to-year spread probably would widen to 30 per cent., even perhaps 35 per cent., during this half of 1939, with public works spending as the major factor in the gain.

The Standard survey pointed out that cement is a marginal industry, which is to say that once it gets past the break-even point, estimated to be 35 per cent. of capacity, profits mount rapidly.

"The industry as a whole was not much above this border line in the first half of last year," the survey indicated, "but the rise in shipments in the second half put it well into the black and the gains in production indicated for the present half should result in fairly sharp gains in earnings.

"The tariff of 4½ c. a hundredweight on imports has not been effective in stemming foreign competition along the eastern seaboard, and particularly in Gulf ports. But the Florida harbor inspection tax on cement imports, if upheld by the United States Supreme Court, and if subsequently adopted by other seaboard states, would prove an important supplement to the present barrier."

550 Employees Guests at Midwinter Banquet

The Michigan Limestone & Chemical Co., Rogers City, Mich., recently gave a two-day midwinter party for its employees.

The celebration closed with a huge banquet served to 550 employees and guests.

Launches Huge Building Program at St. Paul

The Minnesota Mining & Manufacturing Co., St. Paul, will begin construction in about two months of a new office building to cost $400,000 to $450,000, it was announced by W. L. McKnight, president. The new structure is part of the $1,500,000 building and improvement program for the big St. Paul plant.

In the course of remodeling and expansion is Minnesota Mining's No. 1 building in St. Paul, which is being widened and lengthened. The structure originally was 83 ft. by 162 ft., with basement, two stories high.

Also, being expanded is the Minnesota Mining's roofing granule plant at Wausau, Wis. This is one of two such plants, the other being at Akron, O., where quartz is crushed, granulated and the granulated product treated and colored.

To Build 75-Mile Pipe Line to Cement Plant

Negotiations which have been in progress for a long time for construction of a 75-mile pipe line from Webster Parish, La., to the plant of the Arkansas Portland Cement Co., at Okay, Ark., were completed last month.

Announcement of the deal was made by J. F. Kauffman, superintendent of the Okay plant. Assisting him in the negotiations was M. O. Matthews, superintendent of the Oklahoma Portland Cement Co. The line will cost about $356,312.

Consolidated to Place New Dredge in Service

A new electric-powered marl dredge is going into service this spring at the plant of the Consolidated Cement Corp., at Cement City, Mich.

The work of installation has been supervised by Gus J. Wittenberg, superintendent.

West Sumatran Cement Plant to be Enlarged

The Nederlandsch-Indisch Portland Cement Maatschappij has definitely decided to expand its present cement plant facilities at Pendang, West Sumatra, according to a report to the Department of Commerce from the office of the American Trade Commissioner, Batavia.

Cleveland Levies High License Fee on Mixers

All owners of concrete mixers and tar spreaders in Cleveland, O., must take out automobile licenses, it has been announced by Chief Police Prosecutor Gerard Pilliod.

The licenses cost $200 and $300.

Ready-Mix Operator Here from Honolulu

CAME TO ATTEND CONVENTION

Traveling nearly 10,000 miles on the round trip, L. P. Price of the Ready-Mix Concrete Co., Ltd., of Honolulu, came the longest distance to attend the recent convention of the National Ready Mixed Concrete Assn. at Cincinnati, O.

Until four years ago Mr. Price was working as an engineer with a San Francisco building firm. The company got a contract from the United States Navy to do some construction work at the Pearl Harbor navy yards which, like the city of Honolulu, is located on the island of Oahu in the Hawaiian Islands group.

Sent to help in the work at Pearl Harbor Mr. Price received an offer from the concern for which he is now working to remain there and become assistant manager of the business. Because the islands appealed to him he accepted. He returned to San Francisco and took his wife and two daughters, Rosemarie, 15, and Diane, 10, with him.

"Honolulu and the whole group of islands are so beautiful that I hope to enjoy them the rest of my life," said Mr. Price. "Living conditions are ideal, with the temperature in Honolulu never getting above 83 deg. in summer or below 66 deg. in winter."

New Plant's Capacity Is 400 Tons per Hour

Early completion of the $250,000 sand-and-gravel plant of Graham Brothers, Inc., near El Monte, Cal., has been announced by Paul C. Graham, president and general manager of the company.

The new plant will have a capacity of 400 tons per hour, as compared with a capacity of 100 tons per hour for the former El Monte plant of the company. The new plant is of all-steel and concrete construction, located on a 220-acre site of excellent deposit.

Graham Brothers is a Long Beach institution, organized about 30 years ago by Paul C. and the late Robert Graham as a co-partnership. The company's first equipment was a team and wagon, two shovels and a sand-and-gravel pit on Signal Hill, later developed as an oil property.

Officers and directors are: Paul C. Graham, president, general manager and chairman of the board; Corder Livingston and H. F. G. Pelsue, vice-presidents; W. M. Cook, secretary-treasurer; Llewellyn Bixby, C. C. Lewis and Russell C. Graham, directors.

New Lime Plant Will Rise in N. Carolina

WORK TO START THIS MONTH

A new concern known as the Atlantic Lime Corp., with an authorized capital of half a million dollars, is to build a large, modern lime plant at Holly Hill, N. C., for the manufacture of chemical, building and agricultural lime as well as brick mortars.

It is the plan of the company to utilize waste gases from the kilns for the manufacture of solid carbon dioxide (dry ice). It is reported that the plant will be built in two units, construction to start in March on the first unit, for the production of agricultural lime and road material.

J. Innes McCants, who heads the Atlantic Lime Corp. as president and treasurer, has been identified with the cement and building material industry for 20 years. He also was connected with the International Paper Co. for a number of years as southern representative. For 12 years he was sales manager of the old Standard Portland Cement Co. at Birmingham, Ala.

U. S. Gypsum Plant in Florida Now Operating

The United States Gypsum Co. has announced that its new plant at Jacksonville, Fla., has reached completion in record time and has started operations.

Crude gypsum rock is unloaded at the docks of the new plant from USG ships sailing directly from the company's deposits in Nova Scotia.

Finished products ranging from plaster and plaster bases through a score of equally important materials for all kinds of construction purposes can reach even the farthest point in the Southeast with practically overnight delivery from the new plant.

McGrath Gravel Plant Is Nearing Completion

Construction of a washing-and-screening plant by the McGrath Sand & Gravel Co. of Lincoln, Ill., is in progress southwest of Bloomington, Ill., on extensive sand-and-gravel deposits recently acquired by the company.

The new plant is to be served directly by the Alton railroad. It will have a daily production capacity of 2,500 tons and will provide employment for approximately 25 men during the production season.

E. H. King has moved to Bloomington from Peoria as a representative of the company. J. W. McGrath is in charge of operations; T. E. McGrath, sales and traffic; Thomas P. McGrath, office management.

The Bloomington plant is being constructed to replace the Mackinaw, Ill., plant now being dismantled. The Mackinaw plant, established in 1910, served the territory reached by the Illinois Terminal, Big Four and Vandalia railroads while the new plant will be available to the Alton, Illinois Centra, Illinois Terminal, Big Four and L. E. & W. railroads. All available Mackinaw material and equipment is being used in the Bloomington plant.

In announcing work on the new plant, Mr. King issued a statement of expenditures over a 30-yr. period which included the following items: Plants, $1,320,581; repairs and supplies, $1,104,387; labor and employes' wages and salaries, $3,118,344; gravel lands and royalties, $691,978; power and fuel, $907,712.

RECENT GOVERNMENT CONTRACTS FOR MATERIALS

Date of Delivery 1939	Source of Supply	Government Agency	Commodity	Amount
6/30	Monolith Portland Cement Co., Los Angeles, Cal.	WPA, Treas., Proc.	Cement	$10,575.00
6/30	Toledo Concrete Pipe Co., Toledo, O.	WPA, Treas., Proc.	Concrete pipe	39,715.50
6/30	Universal Concrete Pipe Co., Columbus, O.	WPA, Treas., Proc.	Concrete pipe	20,525.00
1/11	Lock Joint Pipe Co., Cleveland, O.	WPA, Treas., Proc.	Concrete pipe	11,163.45
1/30	Lock Joint Pipe Co., Cleveland, O.	WPA, Treas., Proc.	Concrete pipe	15,507.15
5/4	New York Trap Rock Corp., N. Y.	WPA, Treas., Proc.	Crushed stone	20,700.00
Indef.	The Marble Cliff Quarries Co., Columbus, O.	WPA, Treas., Proc.	Limestone	37,622.50
3/29	J. R. Nieves & Co., Arroyo, P. R. Florida Portland Cement Co., Tampa, Fla. Lehigh Portland Cement Co., Allentown, Pa.	P. Rico Reconstr. Adm.	Portland cement	11,580.00
2/13	Garcia Hermanos, S. en C., Bayamon, P. R. Florida Portland Cement Co., Tampa, Fla. Puerto Rico Cement Corp., Catano, P. R.	P. Rico Reconstr. Adm.	Portland cement	26,290.80
6/30	Pacific Portland Cement Co., San Francisco, Cal. Pacific Portland Cement Co., Redwood City, Cal.	WPA, Treas., Proc.	Portland cement	66,800.00
6/30	Monolith Portland Cement Co., Los Angeles, Cal. Monolith Portland Cement Co., Monolith, Cal.	WPA, Treas., Proc.	Portland cement	50,000.00
Indef.	Ash Grove Lime & Portland Cement Co., Louisville, Neb. The Nebraska Cement Co., Superior, Neb.	WPA, Treas., Proc.	Portland cement	11,550.00
4/15	Hawkeye Portland Cement Co., Des Moines, Ia.	WPA, Treas., Proc.	Portland cement	10,087.50
6/30	Helms Concrete Pipe Co., Inc., Alexandria, Va.	Treas., Proc.	Concrete pipe	Indefinite
6/30	Concrete Pipe & Products Co., Inc., Richmond, Va.	Treas., Proc.	Concrete pipe	Indefinite
2/28	The Toledo Concrete Pipe Co., Toledo, O.	WPA, Treas., Proc.	Concrete pipe	14,184.06
6/30	L. Suzio Trap Rock Co., Meriden, Conn.	War, Engineers	Riprap	10,920.00
Indef.	Spokane Portland Cement Co., Spokane, Wash.	Treas., Proc.	Portland cement	Indefinite
Indef.	Three Forks Portland Cement Co., Denver, Colo.	Treas., Proc.	Portland cement	Indefinite
Indef.	Universal Atlas Cement Co., Birmingham, Ala.	WPA, Treas., Proc.	Portland cement	11,800.00
2/2	Keystone Portland Cement Co., Bath, Pa.	WPA, Treas., Proc.	Portland cement	33,099.00
6/30	Lone Star Cement Corp., Birmingham, Ala.	Navy, S&A	Cement	Indefinite
6/30	Massey Concrete Products Corp., Chicago, Ill.	Treas., Proc.	Concrete pipe	Indefinite
Indef.	IndependentConcretePipeCorp., Indianapolis, Ind.	WPA, Treas., Proc.	Concrete pipe	59,986.16
3/31	Swanton Lime Works, Inc., Swanton, Vt.	Agriculture	Limestone	Indefinite
3/31	Champlain Valley Lime Co., Winooski, Vt.	Agriculture	Limestone	Indefinite
3/31	Green Mountain Lime Corp., New Haven, Vt.	Agriculture	Limestone	Indefinite

Starts Production at New California Plant

The Hubbs Building Material Co., Colton, Cal., has started operations at its new sand-and-gravel plant near that place.

Equipment supplied by the Brown-Bevis Equipt. Co. of Los Angeles includes a Symons vibrating screen and Butler steel bins.

Supplies Materials for Arkansas River Dike

The Little Rock Stone Products Co., North Little Rock, Ark., is delivering 7,500 tons of sand and gravel to the U. S. Engineers for rebuilding a dike in the Arkansas River near Little Rock.

Cites Cast-Stone Firm for Misleading Claims

The Federal Trade Commission has issued a complaint against Roy D. Burnsed, trading as the Southern Art Stone Co., 1927 Piedmont Road, N. E., Atlanta, charging violation of the Federal Trade Commission Act in the sale of imitation marble and granite tombstones and memorials.

In advertising his products, which are produced from a mixture of crushed marble or granite, cement and other ingredients, Mr. Burnsed is alleged to have represented that they are made of genuine, natural marble and granite; that they take and retain a higher polish and luster than ordinary marble or granite, and that they will last forever.

Alleging that these representations are false and misleading, the complaint points out that his tombstones and memorials have the general appearance of natural marble and granite products of this class, and that nowhere in his advertising matter is it disclosed that they are synthetic or cast stone memorials.

Workmen Put Out Fire at Ohio Gravel Plant

A score of workmen, just reporting for duty, were pressed into service early one morning recently to extinguish a stubborn blaze in the Miamiville, O., plant of the Ohio Gravel Co.

The fire caused $7,000 damage.

The Smith Construction Co. of Flora, Ind., reports that it has purchased the gravel pit, formerly known as the John Allen Gravel Pit, located east of Flora.

New Operating Firm Formed in New York

TAKES OVER STONE PLANTS

According to Otho M. Graves, president, General Crushed Stone Co., Easton, Pa.; and F. W. Schmidt, president, Buffalo Crushed Stone Co., Buffalo, N. Y., an agreement has been entered into between their respective companies whereby a new company will be organized to acquire all the real estate, plants, and equipment at the Akron, N. Y., operation of the General Crushed Stone Co. and the Bowmansville, N. Y., operation of the Buffalo Crushed Stone Co. These two plants will be owned, controlled and managed by the new company which will be known as the Buffalo Crushed Stone Corp.

The Buffalo Crushed Stone Corp. will own approximately 750 acres of high-quality limestone deposits and two modern crushing plants with an annual crushing capacity of 750,000 tons. The corporation, in addition to its activities in the producing and marketing of crushed stone in the Buffalo area, will also engage in the manufacture and marketing of bituminous-concrete paving materials. Plants are situated on the New York Central R. R. and are advantageously located for shipments by rail or truck.

The board of directors of the Buffalo Crushed Stone Corp. will consist of Otho M. Graves, James Savage, Arthur Savage, F. W. Schmidt, John H. Schmidt and A. G. Seitz. The officers of the corporation will be F. W. Schmidt, president and general manager; John H. Schmidt, vice-president and chief engineer; A. G. Seitz, vice-president in charge of operations; James Savage, secretary, treasurer and resident manager; and Arthur Savage, assistant secretary and assistant treasurer. A. J. Hooker, for many years sales manager for Buffalo Crushed Stone Co., will be appointed sales manager for the Buffalo Crushed Stone Corp. Thomas Cave, superintendent, Bowmansville plant, will be appointed superintendent. Paul Gibbons, superintendent, Akron plant, will be appointed assistant superintendent.

Upturn Is Reported for Gypsum Industry

Activity in the gypsum industry in the October-December period, as covered by the Bureau of Mines canvass, declined seasonally from the July-September period but for the first time in 1938 was better than in the similar period of 1937. This strong year-end position reflects the improvement in the construction industry that occurred in the last few months of 1938.

Although production and sales of gypsum and gypsum products in the fourth quarter of 1938 were higher than in the like period of 1937, the yearly totals for 1938 were below those for 1937 under all classifications except gypsum lath, which increased. After adjustments for changes in statistical coverage the following approximate improvements in sales during the fourth quarter of 1938 over the similar period of 1937 were noted: Apparent supply, about one-twentieth; calcined produced, one-tenth; uncalcined sold, one-fourteenth; manufacturing uses, one-twentieth; Keene's cement, two-thirds; all other building plasters (gaging, prepared finishes, etc.), one-fifth; lath, one-third; wallboard, one-twentieth; and tile, one-twentieth. Declines in yearly totals for 1938 (adjusted) were approximately as follows: Apparent supply, one-eighth; calcined produced, one-twelfth; uncalcined sold, one-seventh; Keene's cement, one-fifth; all other building plasters, one-sixth; wallboard, one-twenty-fifth; and tile, one-eighth. Gypsum lath, the sole item to show an increase, gained about one-twentieth over 1937 figures.

Universal Shifts Two Departments to N. Y.

The Universal Atlas Cement Co., Chicago, has shifted its advertising and technical service departments to New York. Max A. Berns is in charge of advertising, with the title of publicity director, with A. E. Webster as assistant. H. G. Farmer heads the technical service bureau.

Storage-Plant Addition Will Cost $130,000

The United States Gypsum Co. has plans in progress for an addition to its New Brighton, N. Y., plant to cost $130,000.

The new structure will be used for the storage of gypsum board and other products.

Announce Low Rate for Round Trip to Coast

Responding to the campaign for reduced fares, instituted by the Golden Gate International Exposition as part of its "Be the Guest of the West in '39" campaign, the Assn. of American Railroads has established a flat rate of $90 coach fare, or $135, plus sleeper, for intermediate or tourist class, for a "Grand Circle" tour from any city in the country to both the San Francisco and New York World's Fairs in 1939.

The Grand Circle tickets are good for two months, at any time between April 28 and October 28. They allow any number of stopovers, and any combination of routes, requiring nothing more than ticket validation at San Francisco and New York.

The Nebraskan may swing down through the Southwest, go north to Treasure Island on San Francisco Bay, proceed to the Atlantic seaboard via the Northern route, and return over the midland rails—rolling up a total of some 9,000 railroad miles for $90 without duplicating routes.

Western bus lines are putting in wide rate reductions, and air lines are doubling their service, but visitors to the World's Fair of the West will receive from the Grand Circle Tour a railway "bargain" of rare economy. The Golden Gate International Exposition opened on February 18.

1939 Edition of P&Q Handbook Published

TWO NEW CHAPTERS APPEAR

The 1939 edition of *Pit and Quarry Handbook and Directory*, just published, is somewhat in the nature of an anniversary edition, being the tenth to appear in its present format. The old page size of 6 by 9 in. was abandoned with the 1929 edition and the larger 8⅜ by 11⅛ in. came into being with the 1930 edition. At the same time the directory of producers was incorporated and each year since the technical text has been revised, old chapters which seemed to have the least interest dropped and new sections added as new trends developed; the Directory section, too, has undergone revision each year to keep it accurate and up-to-date.

The new edition for 1939 has been no exception to this rule of constant improvement. Revisions have been numerous and made with painstaking accuracy. Two new chapters appear for the first time: "Specifications for Mineral Aggregates," by Stanton Walker, director of engineering, National Sand & Gravel Assn., and "Concrete Units," by Harry F. Utley, assistant editor, PIT AND QUARRY.

Copies of this 890-page volume are mailed free of charge to producers listed in the Directory section; to all others the charge is $10.00 per copy.

New Dredge Hull Built by Illinois Producer

The Eastwood Sand & Gravel Co., Grayville, Ill., has a new hull under construction for its dredge.

The new hull will be 65 ft. long and 20 ft. wide.

EDITORIAL

Amending the Labor Relations Act

LIKE practically every other legislative enactment of the present administration in Washington, the National Labor Relations Act has been widely and bitterly attacked by newspapers of different political alliances. The decisions of the National Labor Relations Board, which the act brought into being, have been held up to ridicule and have been characterized as un-American, anti-social, pro-labor union, and Communistic. There has been a conspicuous lack of factual analysis of either the act's objectives or of the board's decisions. Isolated cases, which provided points vulnerable to attack, have been chosen as examples of the law's inevitable injustice and of the discriminatory effects of the decisions made under the act. Emphasis on these selected cases has not helped toward a proper understanding of the law or of the powers, duties and decisions of the board created by it. This is to be regretted, in our opinion, because it stresses unduly the differences in interests and points of view between employers and employees and adds to the mistrust that too often exists between them.

Much of the adverse criticism directed at the act and the board, it should in fairness be said, has been due to unfamiliarity with it and its aims. Much, too, has been due to a deliberate attempt to discredit the law in the eyes of the public; some of this to an intent to malign every legislative act of a government of opposite political color, and some to a desire to oppose any movement that has as its object an improvement in the position of labor. The number and variety of groups whose interests seemed to be injured or to be threatened with injury by this relatively new piece of social legislation has made the current one-sided approach to the problem almost inevitable. There has been little effort to present the other side of the problem or even to invite an unbiased consideration of it.

In the preamble of the act its purpose is said to be "to eliminate the causes of certain substantial obstructions to the free flow of commerce and to mitigate and eliminate these obstructions when they have occurred by encouraging the practice and procedure of collective bargaining and by protecting the exercise by workers of full freedom of association, self-organization and designation of representatives of their own choosing, for the purpose of negotiating the terms and conditions of their employment or other mutual aid or protection." The preamble states also that "the denial by employers of the right of employees to organize and the refusal by employers to accept the procedure of collective bargaining lead to strikes and other forms of industrial strife or unrest." In its report on the bill the Senate committee said that "the most fertile sources of industrial discontent can be segregated into a single category susceptible to legislative treatment. Competent students of industrial relations have estimated that at least 25 per cent. of all strikes have sprung from failure to recognize and utilize the theory and practices of collective bargaining, under which are subsumed the rights of employees to organize freely and to deal with employers through representatives of their own choosing." This truth is stated in the preamble, where it is said that "Experience has proved that protection by law of the right of employees to organize and bargain collectively safeguards commerce from injury, impairment, or interruption, and promotes the flow of commerce by removing certain recognized sources of industrial strife or unrest, by encouraging practices fundamental to the friendly adjustment of industrial disputes arising out of differences as to wages, hours, or other working conditions, and by restoring equality of bargaining power between employers and employees."

Such are the objectives of the law as stated in it and by those who advocated its enactment, and it sets up machinery, in the form of the National Labor Relations Board, to attempt to assure the selection of representatives of the workers free from interference by employers. The board is authorized to determine the representation of employees and to hold elections if necessary to ascertain the wishes of the workers. Having determined that, and having certified the names of the representatives designated or selected by the majority of the employees in a plant, company or other appropriate unit, the representatives so chosen become the exclusive representatives of all the employees in that unit for "the purposes of collective bargaining, in respect to rates of pay, wages, hours of employment or other conditions of employment."

THE law enumerates acts which are considered unfair in the sense that they either deny, impair, infringe or nullify the rights of employees as set up in it. Among such unfair labor practices are a refusal to bargain collectively with the representatives of employees; interference with employees in their work of self-organization and in their right to bargain collectively through representatives of their own choosing; interference with a labor organization or efforts to promote a separate labor organization; discrimination in employment against any worker because of his membership in a labor organization.

The function of the board is to insure the maintenance of and respect for the rights set up in the law. Its attitude is, therefore, necessarily unilateral; it is not and can not be a court empowered to decide between

contending points of view; it has no right to mediate or arbitrate disputes between employers and employees. Were this more generally understood there would be less criticism of the board's actions from those who are not informed concerning the law's provisions and the board's powers. Like the Federal Trade Commission, the National Labor Relations Board is an administrative body charged with the enforcement of the law's provisions and its duty is to prevent unfair labor practices. To expect it to serve in any other capacity is to ask it to exercise powers that have not been given it.

SOME of the suggestions for amending the act evince the same lack of understanding of its purposes. An example is the proposal that the act be amended to provide some regulatory measures for labor unions, which overlooks the fact that the act was designed to insure the practice of collective bargaining and not to regulate labor organizations or trade organizations.

Other proposals touch the method of selecting the unit that is used as the basis of employee-representation determinations—a matter now left to the discretion of the board—and the power of the board to cancel existing labor contracts, however unfair or collusive these may be. These are proper matters for consideration by amendment because they go to the provisions of the law itself, and do not seek to alter the purpose of the law or to broaden its applicability.

Newspaper and other clamor against the decisions of the National Labor Relations Board discloses a like unfamiliarity with or indifference to the facts. It should be known that of the large number of complaints filed with the board relatively few ever come before it for decision. Of more than 12,000 cases filed with the board during the first fifteen months following April 12, 1937—the day on which the law was validated by the Supreme Court—55 per cent. were settled by agreement, 40 per cent. were dismissed or withdrawn, and only 5 per cent. reached formal hearing and court action. More recent statistics show a similar picture. In 33 months of active operation the board handled 14,832 cases. Several million workers were involved. Fifteen per cent. of these cases reached the board before the decision of the United States Supreme Court validating the law, the remaining 85 per cent. reached it after that decision had been made. Of the 11,190 cases closed by the date on which these data were collected, approximately 98 per cent. were disposed of by the board's regional offices. Only 250 cease-and-desist orders had been issued by its Washington office.

Other facts are of interest. The number of workers restored to their jobs after discriminatory discharge was approximately 10,000. In the fifteen months from April, 1937, to July, 1938, the board held 890 elections. Established labor unions won approximately 75 per cent. of these, a fair indication that the workers involved desired labor-union affiliations.

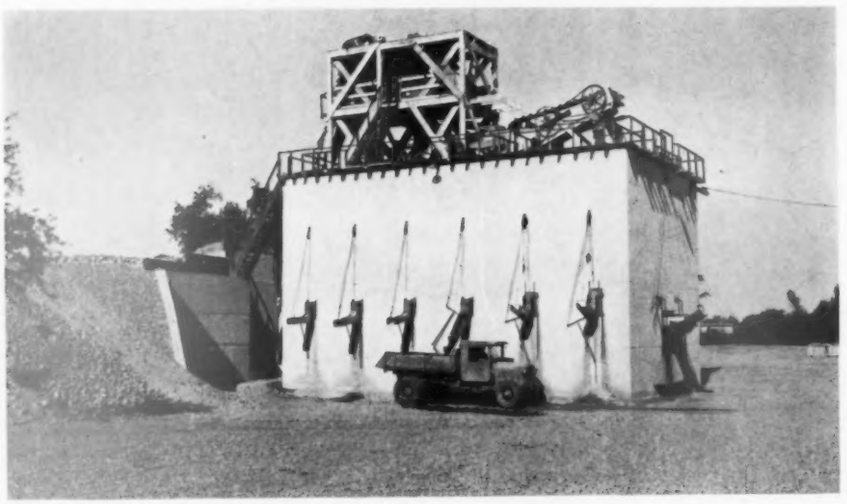
Criticism of the board has often been made on the ground that nearly all its decisions are in favor of the employees involved. On its face this appears to be a very serious charge; indeed, it seems to be almost conclusive evidence of bias. Yet it should be remembered that every case which reaches the board for formal hearing has been given very careful consideration. A regional office of the board has given it a preliminary investigation to ascertain whether the complaint has validity. A field investigator has interviewed the complainant and the respondent, and if the complaint was not found to be valid, it was dismissed or the complainant was asked to withdraw it. By this process 40 per cent. of the cases were eliminated before reaching Washington. In cases where the complaint seemed to be well-founded an effort was made by the regional director to effect an agreement on the part of the employer to comply with the law. This accounts for the high percentage, 55, of the cases settled by agreement. Quite obviously, the remaining 5 per cent. of the complaints were pretty nearly what lawyers call "ironclad," so it is not to be wondered at that only a small number were decided against the complainant. The record discloses a very careful sifting process, rather than the existence of a prejudiced attitude on the part of the board.

And in this small number of cases which reach formal hearing and decision the board has no punitive power, except for its ability to impose the penalty of paying back wages to employees discriminately discharged, and even this can be enforced only through the courts. Where a respondent is ordered to "cease and desist" because of his unfair labor practices, the board must petition the Circuit Court of Appeals if it wishes to enforce its order.

THE charges of unfairness brought against the board appear in a different light when it is recalled that of the 97 board cases reviewed by the courts in the period mentioned above, every one was decided in favor of the board. Our courts reflect in general the attitude of conservatism with respect to cases arising under new laws and can not, as a group, be suspected of favoring radical changes or the imposition of new restrictions upon well- and long-established practices. By their very nature they are among the last to reveal by their decisions the changes that occur in social thinking. Their actions are well circumscribed by existing law and prior decisions and their approval of new legislation is given or withheld in accord with the limits set down by precedent.

The National Labor Relations Act is likely to be amended, when the need is made evident, but amendment will probably not lie in the direction of softening the provisions of the law or its penalties. The principle for which it was enacted has been given Supreme Court approval and is not open to attack on the ground of unconstitutionality, so other reasons for change will have to be found.

LEFT—Loading truck from dry river-bed. Water in foreground shows water table after long dry season.



This view of the plant shows the massive concrete construction of the bins. The concrete-walled truck ramp is at the left.

Plant Structure Designed to Resist Damage from Floods

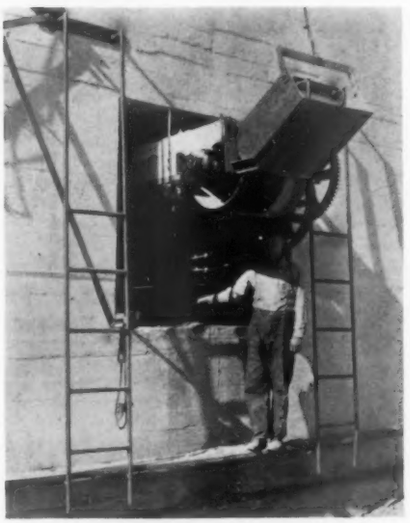
IN the heart of one of the great vineyard sections of California is the new sand-and-gravel plant of the Central Rock & Sand Co. Located in the San Joaquin Valley near Sanger, 14 mi. east of Fresno, Cal., this plant serves a rapidly-growing community. Much of the product is used for the construction or maintenance of irrigation canals and works. The outstanding feature of this modern new plant is the capacity obtained with a force of only 4 men and motors of only 70 installed hp.

The deposit is the bed of the Kings River, which is dry except for a few months during the rainy season. It was first worked commercially ten years ago by J. F. Hill, who operated it as the Sanger Gravel Pit until 1934. Mr. Hill then sold the property to the Central Rock & Sand Co., which operated the original plant until early in 1937. It was damaged by a flood at that time and was replaced by the new plant, which was completed in May, 1937. Mr. Hill continues as general superintendent for the company.

There is considerable variation in the grading of the material in different parts of the deposit so that almost any desired selection can be made to meet customer demands. As in the cases of other similar deposits in California, the seasonal rains renew the material taken out, making the deposit virtually inexhaustible. The average sand content is about 35 per cent. and the largest rock is about 7 in. in size.

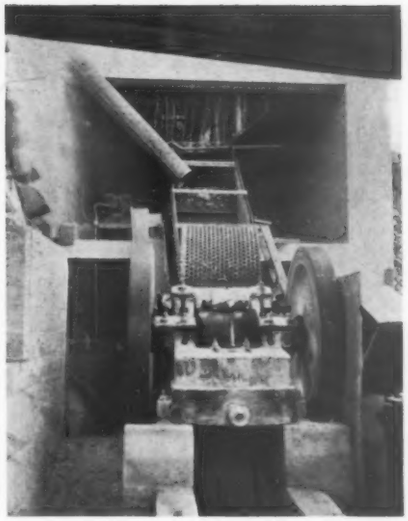
Loading is done with a Koehring gasoline drag-line handling a ¾-cu.yd. bucket. Two trucks, one Mack and one Sterling, haul the material about 1,000 ft. to the plant, carrying about 8 tons per trip. At the plant the trucks are backed up a ramp to discharge their contents into a 21-ton steel-and-concrete hopper. With only two trucks this plant has a capacity of about 50 tons per hr.

An Allis-Chalmers reciprocating feeder discharges the material from the hopper into a 9-in. by 15-in. Allis-Chalmers jaw crusher. The 1½-in. minus product of this machine is taken by a belt-bucket elevator, which is 69 ft. long between centers, and discharges it through a feed box on an Allis-Chalmers 2-deck, 3-ft. by 10-ft. Low Head vibrating screen. Usually wire cloth with ½-in. and 1¼-in. openings is used on the top deck and cloth with ¼-in., ⅜-in. and 1-in. openings on the bottom deck. The bottom deck is split between the ¼-in. and ⅜-in. sections. This makes possible the production of four sizes of material, ¼-in. to ½-in., ½-in. to ⅜-in., ⅜-in. to 1-in., and 1-in. to 1¼-in., in addition to oversize and sand. These four sizes are chuted direct to storage bins.



Supt. J. F. Hill at the levers which control gates feeding from bins on mixing conveyor for truck loading.

The belt-drag box which is used for grading and dewatering sand. Gravel chute from screen is in foreground.

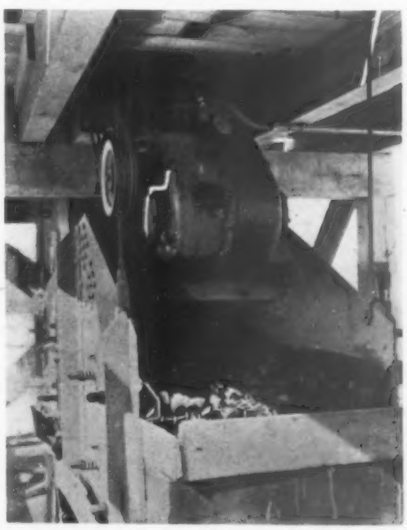


The 9-in. by 15-in. primary jaw crusher with elevator to vibrating screen at left. The feeder is in background.

The oversize is chuted into an Allis-Chalmers No. 3 Gates gyratory crusher for reduction to 1-in. size and under. The same elevator returns the crusher product to the screen. A metal box collects all the waste off the return flight of the elevator belt. This material is discharged through a pipe into the secondary crusher.

The minus ¼-in. material from the screen goes with the wash water through a flume into a 30-in. by 20-ft. sand-drag, which ordinarily produces concrete sand. Grading of the product can be controlled by raising and lowering a movable overflow discharge gate. When plaster sand is desired, the material is obtained from certain parts of the deposit. Water for the drag and for the sprays on the screen is supplied from a 50-ft. well.

The reinforced-concrete storage bin has six compartments, each 16 ft. square and 18 ft. deep. Trucks are loaded through two chutes on one side of each compartment. Various sizes of material can be blended by means of a 24-in. by 48-ft. belt-conveyor in a tunnel under the bin. Two sliding gates under each compartment are controlled by levers from outside the tunnel. The desired sizes are proportioned by means of notches on these levers and the accuracy of this method is evident from the fact that the blended sizes meet all specifications. Trucks are loaded from the conveyor. All shipments are weighed on a 20-ton Fairbanks scale with a 34-ft. concrete platform. A ⅜-cu.yd. Universal gasoline shovel is used for stock-piling and reclaiming.



The 2-deck, 3-ft. by 10-ft. horizontal screen which produces four sizes of aggregates, oversize and sand.

The 20-ton truck scale used for weighing out the products of this plant.

The unusually massive bin structure is designed to resist any floods which might come down the river during the rainy season. This monolithic-concrete structure contains 21 tons of reinforcing steel and rests on a solid concrete mat. The crusher is mounted on concrete and it and the elevator are protected by the concrete retaining walls of the truck ramp. All the other plant equipment is far above the highest flood level. The plant is on higher ground than the plant it replaced.

Most of the equipment for this plant was supplied by the Allis-Chalmers Mfg. Co. including the crushers, the screen and most of the motors and other electrical equipment. Allis-Chalmers Texrope is used to drive most of the equipment.

Stone Screenings for Icy Pavements

At this time of the year the hazard of ice on highways again becomes an important consideration. On grades and curves and particularly at dangerous intersections it is necessary that every possible precaution be taken to protect the traveling public from skidding accidents. It is not feasible to entirely remove ice from pavements and the most effective means for combating slippery conditions is to use a gritty material, so treated that it will embed itself in the ice layer.

Stone screenings possess characteristics which make this material exceptionally efficient for the treatment of icy pavements. They are angular and gritty and, therefore, they offer the highest resistance to skidding, for because of their angularity and sharpness, they become embedded in the ice very readily. Many stone screenings are dark enough in color to readily absorb heat which aids their embedment in the ice. Finally, upon removal of the screenings from the road surface, after thawing has taken place, the used screenings may be applied to the shoulders with excellent effect. Stable shoulders will thus be built up having high load-carrying capacity.

The proper gradation of stone screenings for the treatment of icy pavements is a matter of opinion, but material from ⅛ to ⅜ or ½ inch in size and free from dust should give very satisfactory results. Dust should not be present because this might tend to create a greasy condition which would be of no assistance in preventing skidding.

If stone screenings are applied to the ice directly, with no treatment of any kind, they will not embed themselves readily and, therefore, it becomes necessary to use either calcium chloride or sodium chloride solution mixed with the screenings. The use of such solutions has the further advantage of preventing the piles of treated screenings from freezing and they thus may be readily handled when needed. To prevent freezing of the screenings, 25 to 50 lb. of calcium chloride or sodium chloride for each cubic yard of abrasive material should be used. This may be mixed with the screenings, either dry or in solution. Additional calcium or sodium chloride up to the extent of 50 lb. per cu.yd. of stone should be used at the time of treatment. It is highly important, however, that the amount of chemical that is used be kept to the minimum necessary to properly embed the stone in the ice, for, otherwise, concrete surfaces may be harmed through a too great concentration of the salts. Generally 1½ to 2 lb. of screenings per sq.yd. of surface will be sufficient for anti-skid purposes.

As soon as the ice has melted and the screenings are no longer needed, they should be swept off the surface because excessive damage may result to the road surface due to the grinding action of traffic when the surface is covered with this gritty material and also due to the presence of the chloride solution. Slush ice containing chloride solution should be removed from concrete pavements as soon as practicable.—*(The Crushed Stone Journal.)*

Engineering, Merchandising, Economic Problems Discussed at Cincinnati Convention of Crushed-Stone Assn.

WITH a registered attendance of more than 400 persons, the 22nd annual convention of the National Crushed Stone Assn. opened January 30 at the Netherland Plaza, Cincinnati. Three days were devoted to discussions of business conditions, technical problems, and laws affecting the industry.

Those assembled at the convention reëlected the following officers. President: T. I. Weston, Columbia, S. C.; Treasurer: Wm. C. Hilliard, New Haven, Conn.; Administrative Director: J. R. Boyd; Engineering Director: A. T. Goldbeck. The Canadian Region was replaced in the regional set-up by a Mid-Western Region and the Southern Region was changed to the Southeastern Region. Changes were made in the territories of a few other regions to accommodate these changes.

The regional vice-presidents, some of whom were reëlected, are: Eastern, W. M. Andrews, New Castle, Pa.; Central, J. A. Rigg, Ft. Spring, W. Va.; Southeastern, W. T. Ragland, Raleigh, N. C.; Northern, R. N. Wallace, Bay Port, Mich.; Northwestern, P. W. Yett, Portland, Ore.; Western, A. J. Wilson, Watsonville, Cal.; Southwestern, R. S. Wilson, Little Rock, Ark.; Midwestern, N. E. Kelb, Indianapolis, Ind.

All the directors were reëlected with the exception of A. J. Blair, E. Eikel, John Prince and the late A. S. Lane. Newly-elected directors are: A. R. Couchman, New York, N. Y.; Arthur F. Eggleston, Meriden, Conn.; O. M. Stull, Rocky Point, Va.; R. M. Wallace, Bay Port, Mich. H. A. Johann, St. Louis, Mo., and L. W. Shugg, Schenectady, N. Y. were reëlected as representatives of the Manufacturers' Division on the board of directors and Roy Wills, Lima, O. was elected as the third representative.

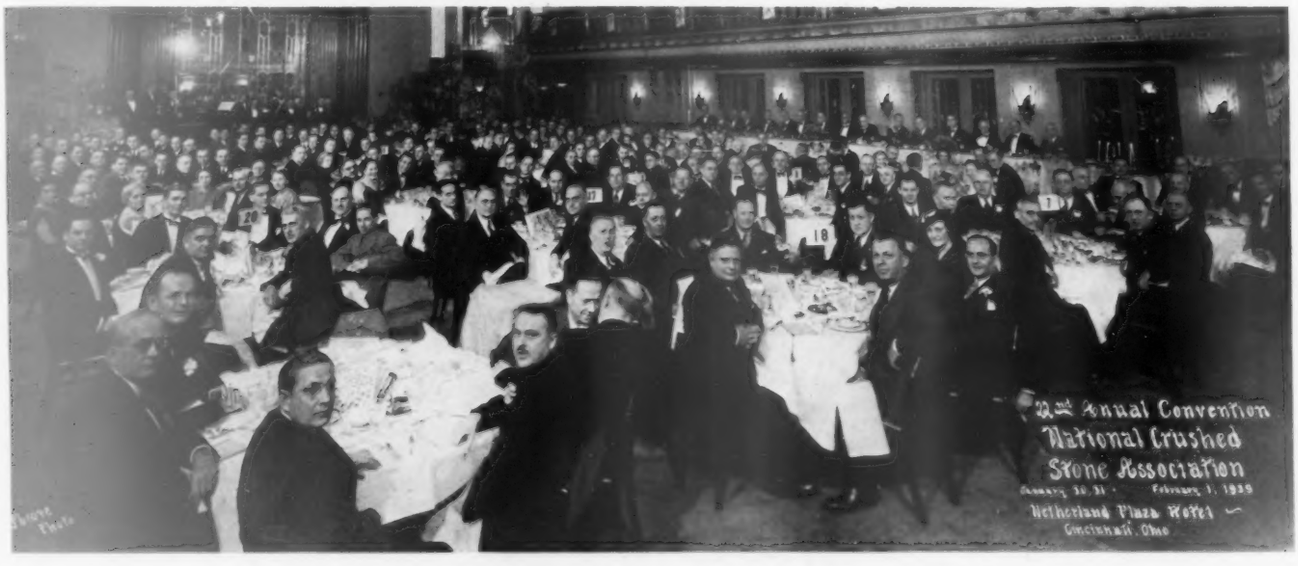
The initial meeting on Monday morning, January 30 was presided over by T. I. Weston, president of the association. After calling the meeting to order and extending greetings to all those present Mr. Weston asked for the reports of the regional vice-presidents of the association on business conditions in 1938 and the outlook for 1939.

N. E. Kelb (Ohio & Indiana Stone Co., Indianapolis, Ind.), reporting for the northern region, said that business in 1938 was not as good as in 1937 but that prospects for 1939 were better.

J. A. Rigg (Acme Limestone Co., Ft. Spring, W. Va.), reporting for the Central Region, said that the volume of business dropped 10 per cent. in 1938 but prices remained stable. Production averaged 50 per cent. of capacity. The distribution of the output was as follows: Highways, 52 per cent.; railways, 10 per cent.; building, 8 per cent.; chemical and metallurgical, 17 per cent.; agricultural, 7 per cent. Production in 1939 was expected to equal that of 1937, and few price changes are anticipated. Mr. Rigg also commented on the concentration of purchases of highway stone and agricultural limestone in Federal agencies.

In the absence of E. Eikel (Servtex Materials Co., New Braunfels, Tex.), the report for the Southwestern Region was read by W. F. Wise (Southwest Stone Co., Dallas, Tex.). In this territory the volume of production was 85 per cent. of that of 1937 and prices were 10 per cent. lower. Operations were at 25 per cent. of capacity. Highways and railroad ballast each accounted for 25 per cent. of the total output. Production in 1939 is expected to show an increase and few price changes are anticipated.

A. J. Wilson (Granite Rock Co., Watsonville, Cal.), was not able to attend but sent in his report for the Western Region by telegram. According to Mr. Wilson, the volume of business in



The closing feature of the gathering was the annual banquet on the evening of February 1.

northern California was down 10 per cent. and prices were 5 per cent. lower compared with 1937. Highways used 60 per cent. of the total production and plants operated at 40 per cent. of capacity. An increase in production for 1939 is anticipated and prices are expected to be about the same.

A. L. Worthen (New Haven Trap Rock Co., New Haven, Conn.), speaking for the late A. S. Lane on conditions in the Eastern Region, reported a decrease in production but stable prices. Some increase in production for 1939 is expected. Ballast formed an unusually high percentage of the demand in 1938 due to the disastrous hurricane which washed out considerable railway trackage. Mr. Worthen also commented on the standardization of aggregates specifications in the states of Connecticut, Massachusetts and Rhode Island which have simplified production problems in this area. He said there was a possibility that the Maine, New Hampshire, Vermont and New York highway departments would also consider the adoption of the same standards.

R. B. Shepard (Raleigh Granite Co., Raleigh, N. C.), reported for the Southern Region in the absence of W. T.

Ray C. Noll, Whiterock Quarries, Inc., Bellefonte, Pa.; Thos. Osborne and Wm. A. Buchanan, Brooks Equipment & Mfg. Co.

Ragland of the same company. In this region production in 1938 varied from 10 per cent. under to 20 per cent. over that of 1937, but showed an average gain. The demand was 60 per cent. of the industry's capacity and prices averaged slightly under those of the preceding year. The demand was distributed as follows: Highways, 50 per cent.; ballast, 25 per cent.; building, 15 per cent.; agricultural limestone, 10 per cent.

Otho M. Graves (General Crushed Stone Co., Easton, Pa.), then gave the *Report of the Executive Committee on Application for Seasonal Exemption under the Fair Labor Standards Act of 1938.* He reviewed efforts made by the association to have the industry recognized as seasonal. The executive committee, at its meeting in Hot Springs, Va., last fall, decided to collect data from the railways and highway departments which would show the falling off of demand for from 3 to 5 months during the winter in the North and for shorter periods in the South. According to Mr. Graves, data on weather conditions were obtained from the U. S. Weather Bureau and questionnaires were sent to producers to ascertain the hours of plant operation and the manhours of work during various months of the year. The results were tabulated and the executive committee met again in Washington to consider them. It was then decided to send out a second questionnaire which excluded fluxing stone and a few other products in order to give a clearer picture. The committee met again to consider these results and approved the application as prepared.

Left to Right: J. Barab, Kelbar Powder Co.; J. E. Boyd, Weston & Brooker Co., Atlanta, Ga.; J. J. Kelleher, Kelbar Powder Co.; R. P. Immel, American Limestone Co., Knoxville, Tenn.; J. H. Fulkerson, Cross Engineering Co.; Richard Simons, Weston & Brooker Co., Columbia, S. C.; J. W. Herr, Cross Engineering Co.

Quoting from the application, "The determination of whether or not an industry is seasonal is at present measured by the test set forth in Sec. 526.3 of the Regulations which provides; 'The exemption for an industry of a seasonal nature is applicable to an industry which both: (a) Engages in the handling, extracting or processing of materials during a season or seasons occurring in a regularly, annually recurring part or parts of the year; and (b) ceases production, apart from work such as maintenance, repair, clerical and sales work, in the remainder of the year because of the fact that, owing to climate or other natural conditions, the materials extracted, or processed, in the form in which such materials are handled, extracted or processed, are not available in the remainder of the year.'"

According to Mr. Graves the industry definitely comes under (a) and to some extent under (b) but lack of winter demand is the chief reason why the industry should be regarded as seasonal.

The application states that "attempted operation during this winter period would definitely increase the costs and hazards of working and would not be industrially sound. The quarrying of stone is shown by accident statistics to be a hazardous industry and the natural hazards of the operation would be increased during winter months. For example, the carrying of nitroglycerin required in the blasting of the stone from its natural ledges along the top of a quarry with footing uncertain from ice, or near the edge of a quarry face made invisible by snow, is a real one. The handling of quarry tools and equipment with fingers numb from cold vastly increases the liability of personal injury. Transportation of the blasted material from the quarry ledge to the initial crusher, this distance being sometimes as much as several thousand feet, would be an extremely difficult and costly procedure on a quarry floor more or less rough naturally, when covered with snow and ice incident to severe weather in winter months. Employees working under such conditions would be subjected not only to great discomfort but would be even more liable than ordinarily to personal injury due to the increased hazards of the operation. Nor would such operation of the quarries during the winter months, when now they lie idle, serve any useful purpose inasmuch as the market demand for crushed stone practically ceases during this season."

Mr. Graves commented on the fact

Allis Chalmers Mfg. Co.
Manganese Steel Forge Co.
E. I. DuPont de Nemours & Co.

Simplicity Engineering Co.
General Electric Co.
Bucyrus Erie Co.

Pettibone Mulliken Corp.
Marion Steam Shovel Co.
Frog, Switch & Mfg. Co.

that the application shows a smaller drop in man-hours worked than in hours of plant operation. This, he said, was partially due to efforts on the part of employers to make work for their employees. After reviewing briefly the various facts and figures in this application Mr. Graves expressed his opinion that the crushed-stone industry can present a strong case.

The application closes with the following summary. "The crushed-stone industry is definitely of a seasonal nature in that it engages in the handling, extracting and processing of stone during a season occurring in a regularly annually recurring part of the year, and further because it ceases production apart from such work as maintenance, repair, clerical and sales work in the remainder of the year because of the effect of climate. The industry is of the opinion that the evidence and data herewith presented would warrant the Administrator in determining that a *prima facie* case for the granting of exemption has been shown, but should the Administrator hold otherwise, then the industry respectfully requests that he will not deny this application, but will hold a hearing on the application either before him or before his authorized representative, this procedure being in accord with Sec. 525.4 of the Regulations."

Hal G. Sours, chief engineer and assistant director of highways, Department of Highways of Ohio, delayed by bad weather, next gave the address of welcome. He said that the association, chiefly through its research work, provides valuable contributions to highway progress as the proper solution of the industry's problems and is also of benefit to the users of its products. He said that the state of Ohio, if it can match all Federal aid, in 1939 will have $28,000,000 to spend on construction and $15,000,000 on maintenance and repair.

A. T. Goldbeck, engineering director of the association, next told of the *National Crushed Stone Assn. Engineering Investigations During 1938*. He described the research facilities which the association offers to its members for the purpose of protecting present markets and increasing sales. He also reviewed the work done in coöperation with various national engineering organizations in devising test methods and writing national specifications. According to Mr. Goldbeck, several investigations have been made to learn of the trends in construction methods involving various aggregates.

One of the functions of the association, he said, is to investigate means for utilizing excess quantities of materials of certain sizes. Such investigation may take any of a multitude of forms, from the determination of the most suitable concrete proportions to the building of a test section of highway, said Mr. Goldbeck.

He then went on to describe some of the principal investigations carried on in the association's laboratory during the year. One of these was the determination of suitable bituminous mixtures involving quarry fines for a producer with an excess of fine material which he had not been able to sell. Three sizes of fine material—screenings, granolithic and stone sand—were

available. Investigation showed that these materials could be combined into two general types of bituminous mixtures. Mr. Goldbeck then described in detail the tests made to determine the best mixture, most of these being made on the circular track with which the industry is familiar.

"As the result of this test and taking into consideration certain economic features of the mixtures together with other matters of a practical nature, the producer decided to advocate one of the liquefier types of mixtures, and arrangements were made with the state highway department to lay short test sections using mixture No. 6 having 7 per cent. of asphalt. These sections were laid both with and without a binder course on an old concrete pavement and they have now been under traffic since October, 1938.

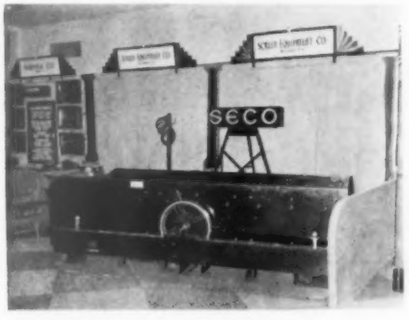
"Although this mixture is a very fine graded, dense type of Amiesite, it has shown no signs of instability and gives every indication of being an exceedingly durable mix under comparatively heavy traffic. Our Bureau of Engineering had control of the mixing at the plant and our suggestions regarding construction procedure were followed. This test is described in some detail, for it illustrates one very practical way in which the association was directly helpful to one of our members in obtaining consideration for an unusual mixture which otherwise would not have been given a second thought by the state highway department."

Mr. Goldbeck also described investigations made of the so-called "bituminated filler" process which has been used successfully in Europe.

"'Bituminated filler' consists of finely-powdered stone dust which is treated with atomized asphalt. Roughly, the method of treatment consists of projecting the dust into a chamber by the use of compressed air and simultaneously injecting atomized asphalt into the same chamber. An intimate intermingling of these two materials occurs and, in spite of the rather high percentage of asphalt thus mixed with the dust, there is only a slight change in color and practically no adhesion of the separate particles of dust. Samples which we have received containing 20 per cent. of asphalt are still in the form of dust, and dust containing 50 per cent. of asphalt has been prepared. This bituminated dust is used as one of the ingredients in a densely-graded, hot bituminous concrete and is said to be capable of use in cold mixtures also.

"The procedure in making such a hot road mixture is to first coat the stone with hot asphaltic cement, using an amount which, when added to the asphalt contained in the filler, will result in a final percentage of asphalt most suitable for producing a mixture having high stability and high durability."

Tests of this type of mixture were made on the circular track. Of the nine types of asphaltic mixtures used, a sheet asphalt mixture containing 11



Gruendler Crusher & Pulverizer Co.
American Manganese Steel.
National Supply Co.

Screen Equipment Co.
Kelbar Powder Co.
Easton Car & Construction Co.

International Harvester Co.
American Bitumuls Co.
Northern Blower Co.

Hercules Powder Co.
Link-Belt Co.
Robins Conveying Belt Co.

Taylor-Wharton Iron & Steel Co.
National Powder Co.
Smith Engineering Works

W. S. Tyler Co.
Thew Shovel Co.
Traylor Eng. & Mfg. Co.

per cent. of asphalt was found to be the most durable. Of two identical "bituminated-filler" mixtures, one containing 6 per cent. and the other 5 per cent. of asphalt, the former was found to be much more durable and gave about the same results as a standard, densely-graded asphaltic concrete containing 7 per cent. of asphalt. Mr. Goldbeck pointed out that these tests were made with a particular limestone aggregate and somewhat different results might be obtained with other aggregates.

In 1937, Mr. Goldbeck reminded his audience, investigations were made which showed that the particle shape of stone sand had great influence on the quantity of water per bag of cement required to produce a given workability. "Extremely-angular particles require a high water-cement ratio for a given workability and, as is well known, a high water-cement ratio results in decreased strength and decreased durability of the concrete. Our tests went further and resulted in the development of a test method for determining whether any sand under investigation has sufficiently cubical shape. This method is described in one of our 'Useful Information' circulars.

"More recent specifications for stone sand have required a finer gradation than formerly was the case, and this year we have directed our efforts to an investigation of the effects of comparatively large quantities of dust in the sand on the various properties of mortar. We made these tests to inform ourselves as to the amount of dust which might be considered permissible in specifications.

From the standpoint of workability, dust would seem to be desirable because of its possible effect in increasing the plasticity of the concrete, but, on the other hand, the question immediately arises as to whether, in view of the large increase in surface area produced by the dust, an excessive amount of mixing water might be required. Then, too, it is natural to inquire whether the dust may not have certain harmful effects, such, for instance, as increasing the shrinkage of the concrete upon drying or increasing its absorption and decreasing its durability. Accordingly, tests were devised to determine the various properties of mortar and concrete as they may be influenced by different percentages of stone dust."

A series of exhaustive tests were made under Mr. Goldbeck's direction, using a limestone having a Deval abrasion loss of 3.5 to 4 per cent., a Los Angeles rattler loss of 3.5 to 4 per cent., and an absorption of only a few tenths of 1 per cent. Six different graduations of sand were used, including dust. Mortars and test cubes were made and tested for expansion and contraction.

As a result of these tests Mr. Goldbeck came to the following conclusions:

"1. To maintain a given consistency in mortars containing dust, varying in amounts from 4 up to 24 per cent., very little increase in the water-cement ratio is required.

"2. Neither the volume of water released upon settlement of the fresh

mortar nor the volumetric shrinkage of the fresh mortar is affected to a significant extent by an increase in dust content up to 24 per cent.

"3. The crushing strength of mortar is somewhat decreased with increasing percentages of dust. The crushing strength of the 24-per cent. dust-content mortar was 90 per cent. of that containing only 4 per cent. dust.

"4. The absorption increases with increasing percentages of dust.

"5. The durability seems to be affected to a significant degree by high percentages of dust, far more than can be accounted for by the rather slight increase in water-cement ratio required to maintain the same consistency.

"6. The shrinkage of mortar upon drying out in the air is practically unaffected by the dust content in the sand.

"These tests are now being continued on concrete and the results are in large part completed except for freezing and thawing. These will be reported at a later date.

"The field of stone sand for use in masonry mortars is one not to be overlooked. Most natural sands are lacking in enough fine material to make them sufficiently plastic when made into masonry mortars. To overcome this lack of fines hydrated lime is used as an admixture to Portland cement or specially-designed masonry cements are employed. Our tests show that excellent masonry mortars may be made by the use of Portland cement mixed with fine stone and containing a large quantity of dust. Frequently, also, stone sand containing a high percentage of dust may be used with very beneficial effects when mixed with natural sand."

Mr. Goldbeck also described tests which illustrated the advantages of stone sand for use in sheet asphalt. The angular shape of stone-sand particles, he said, is favorable to the creation of high stability and because of their somewhat coarser gradation, less asphalt is required than with natural sands. He also stated that a softer asphalt could be used than with natural sands without sacrificing stability. Mr. Goldbeck urged producers of stone sand to look into the sheet-asphalt sand market.

Surface-treatment experiments were also described. These brought out the fact that a deal of judgment must be used in laying bituminous surface treatments because of the varying factors involved. According to Mr. Goldbeck, much progress has been made in this work but much remains to be done.

J. R. Boyd, administrative director of the association, then gave his report of association activities. The various convention committees were announced before the meeting was adjourned.

At the greeting lunch Monday noon Russell Rarey (Marble Cliff Quarries Co., Columbus, O.) presided and introduced the speaker, H. Gordon Hayes, professor of economics, Ohio State University. His subject was *What Lies Ahead for Business?* and he began by pointing out such favorable factors as sound banking situa-

Lima Locomotive Works
Hardinge Co.
Cross Engineering Co.

Brooks Equipment & Mfg. Co.
Kennedy-Van Saun Mfg. & Eng. Corp.
Atlas Powder Co.

Nordberg Manufacturing Co.
Pit and Quarry
Hendrick Manufacturing Co.

W. B. Bobbitt, Radford Limestone Co., Radford, Va.; J. T. England, Acme Limestone Co., Ft. Spring, W. Va.; T. P. Smith, Pembroke Limestone Corp., Pembroke, Va.; E. A. Roush, Acme Limestone Co., Alderson, W. Va.

tion, low inventories, good building prospects, increase in automobile and industrial production and wages. The political situation he considered to be favorable but not the continuation of government spending. Among other unfavorable factors he listed the timidity of capital, the financial condition of the railways, the high building costs in comparison with other costs, the slowing up of the growth of the population, foreign trade, and the general situation abroad.

According to Prof. Hayes, capital building may never again reach former "peaks." He also stated that a better distribution of income is necessary in order to create a better demand. At present, he said, 3 per cent. of the persons get one-third of the income and 3 per cent. of the families get 21 per cent. of the income.

At the Monday afternoon session R. A. Moyer, associate professor of highway engineering, Iowa State College, spoke of the *Skid Resistance of Road Surfaces*. He prefaced his remarks by citing some accident figures compiled by the Travelers' Insurance Co. The 1,500 persons killed and the 38,000 injured annually in skidding accidents and many of the 6,000 killed and 100,000 injured each year in accidents in which the "car is out of control" point to the need for more information about skid-proof surfaces for highways. He then described a test method used to determine the skid-resistance properties of different types of surfaces.

"Tests were conducted by using a two-wheel trailer test unit equipped with either new-tread or smooth-tread tires and an integrating dynamometer specially designed to measure the skidding forces. Since wet conditions create the most common hazard, a water tank was placed on the truck to sprinkle the road when running the wet tests.

"The resistance to skidding which a given surface can provide is best expressed in terms of the coëfficient of friction, which is the ratio of the force causing the tires to skid to the load on the tires. If a large force is required to cause skidding, the coëfficient is large; if the force is small, the coëfficient is small. The tests indicated that practically all roads in the dry condition can provide friction with a liberal amount to spare for the ordinary driving demands and even for the demands when an emergency arises. Many surfaces in the wet condition were found to be almost as safe as in the dry condition, but the tests indicated that there are many surfaces which are dangerously slippery when wet. The surfaces which were found to be most slippery when wet were the bituminous types glazed with a coating of surplus oil, asphalt or tar. Surfaces covered with snow, ice or mud were also found to be very slippery. The latter is not a characteristic of the road surface, but a condition which must be corrected by proper maintenance. . . .

"The conditions which cause skidding are of two types: one in which you apply the brakes and lock the wheels, and we attempted to investigate that by what we call the straight-ahead skidding set-up. In this case the trailer is attached directly behind the tow truck, which has a sprinkler system so we can duplicate the wet condition, since that is the condition we are most concerned about, and we are in a position to apply brakes and to measure quite accurately by the use of a dynamometer that we developed the forces that you have for these different road conditions. The braking condition is probably one of the most serious conditions that we have, and it is the one that we spent a great deal of time investigating.

"The other problem with which we are all familiar, and which is probably associated a little more with the skidding accident, is driving on curves, and for that condition we placed a trailer on an angle much as your car is on an angle on a curve, and were able to measure by the special set-up we have the skidding resistance that the car can develop on a curve. . . ."

On the subject of tire design Professor Moyer said that "a lot of the work we have done contributed to the changes in tire tread design, and we have coöperated very closely with the tire people in carrying out tests along that line. Although our work has largely been on surfaces, nevertheless we are interested in the whole problem.

"Of course, the tire that is most hazardous is the smooth-tread tire, and in all our tests, that is on all surface tests, we use that as one of the criteria of the slipperiness of the road. . . . We should always try to have as great a contact of the tire with the road as we can get. We can't obtain that with a smooth-tread tire, and the more contact the tire has with the road, the greater friction you are likely to develop, even on a wet surface. However, there is the other factor that the smooth-tread tire doesn't provide any chance for the water to be squeezed out from beneath the tire, and as the result of that you are likely to trap water under the tire. There are areas in which the water seems to be trapped under the tire. Then it did not have the contact with the road that it should have had and therefore had lower forces to contend with."

With reference to the effect of the road surface on the driver's ability to stop Professor Moyer said:

"At a speed of 20 mi. an hr. dry concrete will enable us to stop in 30 ft. and that allows for a thinking period, a reaction-time period. If you are on a wet concrete, that increases about 15 ft., up to 45 ft. That is not serious, but if you are on snow or on a mud-covered surface, that may go up to as high as 85 ft. However, if you are on a sleety or icy surface, even at 20 mi. an hr. it would require 150 ft. to stop. That is not impossible and is probably a speed that we may consider safe on ice; that is, we can generally stop, say, in 150 ft.; but let's take the speed of 50 mi. an hr., which is more nearly our average driving speed. As you will

see, our stopping distance now is 150 ft., even on dry concrete, and some 200 ft. on wet concrete; on snow or mud it will be over 400 ft., and I question if you could stop at all on a pavement covered with sleet or ice. It is out of the question to do it with the values of friction that we have measured under that condition.

"The resistance to skidding which the surface could provide decreases, especially with the slippery surfaces, most remarkably with an increase in speed. You might have a coëfficient of friction on some of the asphalt surfaces as high as 1.0; in other words, you could develop a skidding-resistance force as great as the weight of the car. However, at 40 mi. an hr. that force might be only 0.4 of the weight of the car. . . . An asphalt surface, a soft seal coat, that had a coëfficient of friction of about 0.6 at 5 mi. an hr., at 40 mi. an hr. drops to 0.2 or a little less. A coëfficient of friction of 0.2 is about the friction that we can get on ice and on snow, so you can see that some of our wet asphalt roads can be just as slippery as are snow and ice-covered roads. That is a rather serious indictment and it is a condition that we should certainly avoid. . . .

"It was rather interesting to me to study some of these surfaces at close hand; taking a low-power microscope and examining what was actually the condition we could see in that surface. Our best surfaces are of the asphaltic concrete type, or of the type in which you have a roughened texture, sand particles which are uncoated with asphalt. This is a condition that we know and that should eliminate this skidding hazard. Conversely, a surface with a glazed or polished finish was found to be the most slippery surface.

"The condition that we recommend and to which we should work is the one in which the sand or crushed-rock particles are uncoated on the surface with the asphalt, but where the asphalt binds the particles to the layers underneath. In other words, we want to keep the asphalt from the surface on the tops of the particles but we need it as a binder to hold them to the rest of the surface. . . .

"In all our tests, in our driving tests on curves and the braking tests, in our observations of traffic, we have found that the margin of safety when driving at the high speeds of traffic to-day is small, even on dry surfaces where high coëfficients are available. Accordingly, the engineer should make every effort to build the maximum possible amount of skid-resistance into all road surfaces. He should not build surfaces, or permit surfaces to develop, having a polished or glazed surface. He should make every effort to maintain a surface with a sandpaper finish, or with a smooth gritty finish in which hard abrasive aggregate is securely held in place by a somewhat softer cementing medium. The ideal skid-resistant surface is one in which this gritty surface is continually renewable under the action of traffic. With our present knowledge of the causes of slippery surfaces and the remedies to prevent slipperiness, construction and maintenance departments should now be able to develop construction and maintenance standards which will insure that every mile of road is skid-resistant. When this is brought about, "slippery when wet" signs will disappear from our streets and highways and another milestone in traffic safety will have been passed."

Charles M. Upham, engineer-director, American Road Builders' Ann., spoke of the future development of highway building. The title of his speech was *Streamlining our Highway System*.

H. K. Bishop, chief, Division of Construction, Bureau of Public Roads, Washington, gave a brief account of the organization of the bureau and of its administration of highway funds. He mentioned seven states as having adopted constitutional amendments prohibiting the diversion of highway funds to other-than-highway purposes —California, Colorado, Kansas, Michigan, Minnesota, Missouri and New Hampshire.

On the subject of the diversion of gasoline tax and motor-vehicle license-fee funds to other-than-highway uses the speaker said:

"I have read a great many clippings lately and I find that the public, and especially the legislators, or some people in the legislatures, are trying to justify the diversion of gasoline taxes. Of course, the theory on which the gasoline tax was assessed was that the funds derived from it could be used to build and maintain roads for the users, and they were merely paying a toll or a price for having good roads. They try to justify the diversion on the ground of emergency, meeting relief needs, and every other ground, but I don't think it can be justified. I think the funds should all go to the construction and maintenance of state and county roads. Some of it is going to the counties and some of it is going into the cities. We have undoubtedly got to do some work for the counties and do some work for the cities, but when some of the funds are used for education and things of that sort, it seems like an assessment on a particular class of people [who are compelled] to pay also all the other general taxes that the rest of the people pay."

The Tuesday morning meeting was presided over by W. E. Kelb, Ohio & Indiana Stone Co., Indianapolis, Ind. The first speaker was Samuel W. Marshall, chief engineer, Pennsylvania Turnpike Commission, Harrisburg, Pa. and his subject was *The Pennsylvania Turnpike*. This project, now under way, is a 160-mi. toll road connecting Pittsburgh and Harrisburg, which is being built largely on the right-of-way of a railroad started 50 years ago but never completed. As former chief engineer of the Pennsylvania Department of Highways, Mr. Marshall is unusually well qualified to discuss this subject.

D. M. Blackburn, Hendrick Mfg. Co.; A. L. Worthen, New Haven Trap Rock Co., New Haven, Conn.; Otho M. Graves, General Crushed Stone Co., Easton, Pa.; B. G. Shotton, Hendrick Mfg. Co.

This highway is being built at no cost to the state or taxpayers. It is being financed by a P. W. A. grant of $26,000,000 and the R. F. C. has agreed to buy bonds up to $35,000,000. These bonds are to be retired by tolls and the highway will then revert to the state. It will consist of two 4-lane pavements separated by a 10-ft. parkway. Grades do not exceed 3 per cent. and the curves are long as they were originally laid out for a railway.

In the construction of this highway, said Mr. Marshall, about 1,800,000 tons of aggregates will be used. These aggregates will be purchased by contractors from approved commercial quarries. He said the demand for aggregates has already begun and will continue until the project is completed in 1940. This work, he said, will also require 1,500,000 bbl. of cement, 600,000 tons of sand 20,000 tons of steel. By the fall of 1939 about 10,000 men will be employed and another 25,000 men will be needed to supply materials.

Mr. Marshall then pointed out the advantages of extending this turnpike another 125 mi. from Harrisburg to Philadelphia. He also commented favorably on a proposed system of superhighways which would span the country in both directions.

In the ensuing discussion Mr. Marshall said that this turnpike would be of special benefit to truck operators who are now severely penalized by the many long and steep grades on the present routes between Pittsburgh and Harrisburg. The highway will have no intersecting cross-roads and no traffic lights. There will be 11 feeder roads with clover-leaf intersections. No speed limit will be imposed. There will be 8 tunnels totaling 7.9 mi. in length.

Tolls, he said, will probably be $1.25 per trip for passenger cars and from $3.50 to $7.50 for trucks. Lower rates will be imposed for shorter distances. In response to questioning it also developed that stone sand will be acceptable for use on this project.

The next speaker, Merton R. Keefe, chief engineer, State Highway Commission of Indiana, discussed *Future Highway Development as Related to the Crushed-Stone Industry*. In reviewing the highway situation in Indiana Mr. Keefe said that the state maintained 10,000 mi. of highways and that 85 per cent. of these roads are 18 ft. or less in width. Much of this is badly in need of widening and resurfacing. He said that these old roads furnish ideal foundations for new and wider roads but that not over 5 per cent. of the road mileage needs to be more than 2 lanes in width to carry the existing traffic.

Mr. Keefe prefers plant-mixed bituminous mixtures to the mixed-in-place type. The state now requires 100-per cent. crushed aggregates for surfacing. He mentioned tests being made at Purdue University to determine the adhesion and cohesion of various aggregates and bitumen. According to Mr. Keefe, sub-grades have not been given proper attention until recent years. The state of Indiana, he said, in 1937 built a test road of ten different types of materials and in 1938 built another with twelve varieties. The 1938 Indiana farm-to-market program is all under contract and he expressed his belief that government grants for this type of road will continue. Mr. Keefe mentioned the fact that a 1937 law requires the state to maintain routes through the smaller cities and towns.

Col. Willard F. Chevalier, publisher of *Business Week*, next discussed *Present Trends and the Capital Goods Industries*. He opened by referring to the N. R. A. and its codes, which, he believes, awakened business men to the necessity of working together in order to achieve common aims. He then said "that all business and industry is engaged in doing one of two things. Either it is producing and distributing the commodities and the services that people are using up from day to day in the business of living—we call that type of consumer-goods industries because their products are quickly consumed and used up and must be replaced by a new supply; or it is devoted to providing the long-term facilities of industry, of business, of commerce, and of community life. Right here I would like to 'peg' a fallacy that has confused a lot of our thinking with respect to those industries, one that I am going to refer back to in just a few moments so it is important that I 'peg' it right now. There has been a feeling that consumable goods were used up, whereas capital goods were not used up, but they are used up. The only difference is one of degree. They are used up more slowly, and therefore we have come to look upon them as having a sort of permanence, and that fallacy has profoundly affected our attitude toward finance in this country of ours. . . .

"These capital goods, as we call them, consist of what? Factories, railroads, office buildings, homes, highways, flood prevention, water supply, sewerage plants, mills—and so I could go on, but you know what they are as well as I do. A very large part of your business is found in the provision of those facilities. Therefore, your business is intimately tied up with the welfare of the capital-goods industries. When there is no investment of capital in such facilities, you have no business, or at least you have very little business. When there is a great deal of that sort of thing going on, you have good business, and therefore it seems to me to be worthwhile for an industry such as this to stop now and then and take a look at the trends that are going to affect the well-being of these industries —not just to-day or next month, or even next year, but over the long term.

Abe Goldberg, Allis-Chalmers Mfg. Co.; N. H. Humberstone, Marble Cliff Quarries Co., Columbus, O.; E. B. Young, Robt. B. Shepard and R. B. Arthur, Raleigh Granite Co., Raleigh, N. C.

"When we come to this matter of providing the facilities that are required by business and industry and commerce, and the community, we are at once confronted by a choice of two kinds of business. On the one hand we are providing facilities for increased production and service, for expansion of our productive and service facilities as a nation. On the other hand, we are providing such facilities to replace those that have either worn out in the fullness of time or become obsolete because of the progress of the art that they serve.

"Right there is where we come to the first grave question that confronts us to-day in trying to appraise the future of the capital-goods industries, and therefore of your business, for there are in the land those who feel that we are facing a protracted period of no more expansion of our national facilities. I know I am exaggerating to make a point, but substantially there is a school of thought that says to-day that our country has reached its physical frontiers, our period of great expansion in terms of geographical expansion and in terms of new service and productive facilities of one kind or another is over, and that from now on it is going to be a hand-to-mouth existence, with more and more emphasis put upon the consumption of consumable things and services.

"If that is true . . . we are going to have to look more and more toward our replacement market to find a market for our goods. The capital-goods industries will gradually shrink more and more to a mere matter of replacement due to wear-out, deterioration or obsolescence, and if for the moment that be true, then we must turn our eyes in behalf of the welfare of the capital-goods industries as never before to the research laboratories of industry and of our institutions of learning, and wherever we may find them, for it is out of the research laboratories that will come the technology that is going to make obsolete the facilities that we have to-day and make necessary the provisions of new ones for to-morrow. . . .

"I can not imagine any man to-day whose business or whose personal welfare depends upon the prosperity and the well being of the capital goods industries, who is not tremendously concerned and tremendously interested with what is going forward in technical research and technology, for that will be the motive power of his prosperity. If we are not to have that condition, what must be done to insure a continuation of the expansion of our facilities? What must be done if we are to accept the fact of the limits upon our physical frontiers and our geographical frontiers, and the frontiers of our natural resources, and try to continue a period of expansion?

Foreground Left to Right: Russell Rarey, Marble Cliff Quarries Co., Columbus, O.; E. A. Heise, Columbia Quarry Co., Columbia, Ill.; A. E. Conover and Maurice B. Bradley, Robins Conveying Belt Co. Background: E. J. Krause and Giani Pasquale, Columbia Quarry Co.; M. S. Lambert, Robins Conveying Belt Co.

"Only the other day . . . I was talking to a large manufacturer . . . and I expressed myself somewhat as I did just a moment ago as to the future of the capital goods industries, and he said, 'You are entirely wrong. I believe that we are facing a period when we will have an expansion of facilities in this country.'

"I said, 'How do you figure that out? The rate of population increase is declining, our natural resources have been pretty well developed and pre-empted'—not consumed to be sure; we have great wealth still locked up in our natural resources, but nevertheless they have been preëmpted; many of them not only have a deed attached to them but also a mortgage of considerable proportions. I said, 'How do you think that we are going to continue to have a period of great expansion, if we have declining rate of increase in population and if we have our natural resources pretty well preëmpted, and if to-day our great problem is to find consumption for our present productive capacity?'

"He said, 'That is exactly the point.' And may I say to you in explanation to begin with that this man is a very conservative, practical manufacturer, in no sense an idealist or a 'New Dealer' or anything of the sort. He is intensely practical, and he said this: 'We have got to realize that we are moving into a pay-roll economy. We have passed out of the period when every man started out in life with the idea that some day he was going to have his own business and be a proprietor. That road is not going to be open to so many people. We can not have the kind of civilization that we have now and continue to develop it with the same concept socially and economically that we have had up to date. We are passing into a pay-roll economy, where more and more people are going to be on a pay-roll rather than independent proprietors, and that means,' he said, 'that business and industry have got to add a new responsibility to the ones they now have, and that responsibility is to see that every able-bodied person has a chance to earn a living under the system that we have.' . . .

"One of the first considerations . . . that we must face is that of insuring a necessary expansion of our productive facilities, and how are we going to do that? We are going to do that very definitely by enabling more and more of our people to enjoy a higher standard of living. . . . It was shown in the Brookings Institution survey a few years ago that the number of families in this country that are living on an income of less than $2,500 a year constituted, as I recall it, some 70 per cent. of the population, and that all the families with incomes lower than $2,500 could have them raised to $2,500 a year without at all raising the income of the families in the higher brackets . . . and the mere doing of that thing would require an increase in our national productive capacity of 75 per cent. to meet their needs.

"Now you men who have a stake in the capital-goods industries, recognizing there is no demand for your services unless we need additional facilities for production and services, that is a mark to shoot at, isn't it? Never mind

Left to Right: J. M. Thistlewaite, Nordberg Mfg. Co.; A. M. Andrew, Hopkinsville Stone Co., Hopkinsville, Ky.; T. P. Smith, Pembroke Limestone Corp., Pembroke, Va.; A. E. Owen, Nordberg Mfg. Co.; C. W. Lucas, Trego Stone Corp., Skippers, Va.; L. J. Boxley, W. W. Boxley & Co., Roanoke, Va.

the humanitarian aspect of it, never mind your obligation to your fellow man, let's leave all that out of the equation. I am looking at this as a practical business man trying to write a prescription for the future well-being of the capital-goods industries, and I say obviously if I can do something that will require a continuous expansion of the productive facilities of the country, then I am doing a service to those industries.

"How am I going to do it? If I can get more people who can buy more of the things that are going to be produced by those facilities, that is one approach, isn't it? Then when these very careful studies show me that simply to lift those below $2,500 a year per family up to that level will require an increase of 75 per cent. in the productive facilities of the country, it looks to me as though that were the horse that ought to carry our money.

"I think that a tremendous part of the dislocation that breaks down our smooth operation is due to the manipulation of our capital structure, the failure to realize certain fundamental truths about capital, and now I come back to the thing I 'pegged' a few minutes ago, that capital is dissipated and degraded just the same as any other form of goods produced by men. We have tried to build a financial structure in this land of ours predicated upon the eternal existence of our capital structure, and it can't be done . . . I say that the effort to perpetuate the returns of capital have to a large degree sickened the economy to a point where it can not provide the employment, where it can not make it possible for the people below the $2,500 bracket to come up to the $2,500 bracket, where we dry up the sources of the national income that should be going into the hands of those who can keep the business and industrial machine turning.

"We have got to get a new attitude toward capital financing, and I believe we are getting it. I am not preaching any brand new doctrine. I am simply trying to interpret to you something that I see happening to-day. A recognition of this is abroad in the land, but there are hundreds of thousands of business men and industrialists to-day who have got themselves into such an emotional state about wage-and-hour laws and relief and all this budget-balancing, that they are overlooking what seems to me to be the really fundamental thing, that if this is corrected all these poultices will be unnecessary.

"Did you ever hear an Englishman talk about an inheritance? He always says, 'The pater died and left me a thousand a year.' He never mentions the principal sum. But when an American talks about it, he says, 'What do you think, the old man kicked off and left me a million bucks.'

"What is he thinking about? He is thinking that he is going to make that million bucks into a couple of million bucks in a few years. The increment of capital value is ingrained in the American character because we have come from several generations of men where great fortunes have been built by the unearned increment of capital and not out of the earnings of capital. We are beginning to wake up now to the fact that we can not continue to do that, and the great fortunes of the next generation are going to be earned fortunes and not won fortunes. They are going to be fortunes developed by industrialists and not by financial speculators and gamblers. They will be fortunes that will result from the vision to see opportunity and the genius to coördinate human effort and the energy and the administrative ability to run useful businesses that produce the things that people want and need and provide employment for all the people.

"That is where your fortunes of the next few generations are coming from —not by the natural capital increment that grew, of course, with the development of the natural resources of a country that were lying there to be taken and exploited by the first fellow who was smart enough and ruthless enough to come along and do it. We have definitely, in my judgment, passed out of the period of accumulation by accretion into one of accumulation by creation, and just as soon as we do that a whole lot of these other superficial problems are going to be solved automatically, for men can not create wealth without contributing to the well-being of the community of which they are a part, but men can accumulate wealth to the great detriment of the community of which they are a part when it is not accomplished by a commensurate creation.

"Oh, I could go ahead and develop this for a long time but my sands are running out here. I could show you, for example, how we have progressed by leaps and bounds for 100 years with our financial structure always two or three jumps ahead of our wealth structure, and then comes a depression and the financial structure collapses, but the constantly rising growth of the country picked it up and caught it in its arms before it fell calamitously. Then it started up again and fell again, and again the rising development of the natural resources of the country picked it up again and caught it, and then came a day in 1929 when for reasons we needn't go into here it didn't catch it, and it went down, down and down, and now we are beginning to ask ourselves why. I think this is why. You know, you can not capitalize peak earnings and turn it into capital obligations and expect that to go on and on and on. That is just another device for doing the thing that I was describing a few minutes ago—accumulation by accretion.

"We can not have free competition unless we are willing to stand the gaff of free competition. We might just as well face this choice. We can have free competition in our industries or we can have very definite social regulation of earnings—one or the other. You can't put restrictions on competition and expect no regulation of business. We have got to choose, and I believe on the wisdom of that choice is

going to depend the well-being and the health of the capital-goods industries.

"Now lest you think this is all a lot of fantastic theory on my part, I want to read you here a few sentences that were written by a banker—the late Ogden D. Mills, Secretary of the Treasury in the cabinet of Herbert Hoover—no 'New Dealer,' I think. Here is what Mr. Mills said shortly before his death a few years ago: 'We must face that fact that in a free economy there can be no security for capital but that as on the one hand capital must be accumulated for productive investment, simultaneously other capital must be dissipated through the march of progress.' That is that obsolescence that I was talking about. 'We must see to it that the benefits derived from increased efficiency and lower costs are directly and promptly passed on to consumers as the most effective way to insure a wide diffusion of prosperity and increased productivity,'—not used as a basis for increasing the capital obligations resting against the productivity of that plant but disseminated widely through lower prices to the consumers, so that more people may buy more of the things that we want to produce, and that means more employment and more opportunity for people to exchange their services and thereby avoid wanting the Communism and Fascism and the other solutions.

"I am still reading: 'We must keep alive the competitive process which is a most vital element. If we yield to the temptation of resorting to such practices as price-fixing and the suspension of competition through combination or agreement, then step by step we shall be led inevitably to government control.

" 'Since we can not enjoy what we do not produce, the only way to raise the standard of living is to produce more and more. The only way to produce more is constantly to increase our productive efficiency. This is the function and effect of the competitive process. This is why monopoly can not and will not do, for monopoly emphasizes the security of invested capital, whereas free enterprise recognizes that while it is necessary to accumulate capital, it is equally necessary that capital be disseminated under the pressure of new inventions and new methods, obsolescence of markets, changing conditions and the march of progress. Free enterprise seeks to stimulate expansion and progress, monopoly to keep things as they are. The one holds out the shining hope that abundance will conquer poverty; the other can but insure its perpetuation.'

"It is all in Mr. Mills' phrase, the dissipation of capital, and if those who administer the capital of our nation will accept the hard fact, that, whereas the growth of the country and the development of our natural resources in the past may have provided a cushion for this constant expansion of capital claims against our economy, we can not expect to continue to do that; it is necessary that the gains made by our economy be plowed back just as quickly and as widely as possible so that we may do two things: constantly replace the obsolete facilities in our economy, and constantly provide for a higher standard of living for more and more of the people so that they may be able to buy more and more of the products of industry.

"This, it seems to me, is the trend in which we are living. I don't believe that it is being seen widely enough. I believe it is being interpreted as something bad and evil. It is perfectly natural that those of us who may have put our stake into the capital facilities of this country are a bit perturbed and frightened and scared at the fear that we may see these things upon which we had come to count as permanent and eternal, swept away. That is natural. But it is my own firm conviction that unless we do see this truth for what it is, unless we do recognize that we must have a changed attitude toward the responsibilities and the obligations of capital administration, they will be swept away from us, and that sooner or later we shall be carrying on our backs one or the other of the isms that are tormenting the rest of the world to-day."

The meeting on Wednesday morning was presided over by A. R. Couchman, North American Cement Corp., New York City. The first feature of the program was the presentation of awards to the winners of the National Crushed Stone Assn. Safety Contest in 1937. These awards are given by *The Explosives Engineer,* Wilmington, Del.

E. A. Heise, now superintendent, but formerly safety engineer for the Columbia Quarry Co., at the winning Columbia, Ill., quarry, accepted the first award for his company. According to Mr. Heise this quarry up to January 1, 1939 had operated 6 years, 3 months and 9 days without a lost-time accident. In 1938 there were only 7 cases which had to be attended to by a doctor. In closing Mr. Heise expressed his appreciation for the wholehearted coöperation of the employees which made such an outstanding record possible.

The Agricultural Conservation Program for 1939 was the subject of an address by W. G. Finn, director of the East Central Region for the Agricultural Adjustment Administration. According to Mr. Finn, the apparent results of this program include an increase in the use of agricultural limestone. The seven states in his region, he said, used less than 1,000,000 tons in 1931, and in 1932 and 1933 the total consumption dropped to about 500,000 tons annually. The consumption of agricultural limestone increased and in 1936 totaled 1,400,000 tons, in 1937 it reached 1,900,000 tons, and in 1938 approached 2,500,000 tons. According to Mr. Finn, about seven-eighths of the 1938 total was accounted for by payments to farmers.

Mr. Finn went on to say that the A.A.A. program also encourages the

This group includes A. T. Goldbeck, Natl. Crushed Stone Assn.; N. E. Kelb, Ohio & Indiana Stone Co., Indianapolis, Ind.; F. L. Reed and L. D. Townsend, American Bitumuls Co.

use of phosphate, the planting of legumes, etc. In 1936, he said, only 47,000 tons of 16-per cent. phosphate was used while in 1938 the total was 230,000 tons. Of the total payments made to farmers in 1938 about 20 per cent. was for lime and about 12 per cent. for phosphate. Farm income, he said, has always been a guide for the sale of these materials.

Mr. Finn then reviewed the development of the present A.A.A. The original Agricultural Adjustment Act of 1933 was designed to meet an emergency. In 1936 the production-adjustment phase was invalidated and a new act was put in force. This was amended in 1938. The present A.A.A., he said, aims to encourage better land usage, to improve fertility, to maintain a balance between output and prices in order to protect farm income, and to maintain a balance between the amount of food available for consumers and the prices they must pay.

In describing the workings of this program Mr. Finn said that acreage goals are set for soil-depleting crops. The actual land in production, he said, can profitably use three times as much agricultural limestone as was used in 1938. There is a need for better seasonal distribution of the use of this material, so that plants can operate for longer periods and so that farmers can buy it more cheaply. According to Mr. Finn, new sources of supply should also be developed, so that farmers in all areas can buy agricultural limestone at a reasonable price.

The next speaker was Whiting Williams, consultant on labor relations, Cleveland, O., whose subject was, *Give Us This Day Our Daily Job*. According to Mr. Williams, the well-being of the worker of this country is important to us all and is now faced with three very serious threats. In the first place, he said, the government and a large part of the public misunderstands the worker's plea for work and his other desires. The worker wants more than just to make money so he can enjoy life in his leisure hours, said Mr. Williams. He wants security of employment and he also wants the pride and social position that his job carries with it. Mr. Williams went on to relate his own experiences in being promoted from a laborer to a slightly better job. There is, he said, a very definite social structure among workers, and the gap between skilled and unskilled workmen is greater than that between capital and labor. The gap between the employed and the unemployed is even greater. Every worker, he said, craves the feeling that he is important in the scheme of things and a worthwhile human being. According to Mr. Williams, we must understand that a worker wants his job to give him three things: money; a chance at a platform on which he can build his self-respect; and a ladder, the rungs of which will make it possible for him to measure his importance in the scheme of things.

Mr. Williams further said "that the problem of industrial relations is infinitely more complex than if it were a matter merely of the dollars. There isn't an employer here who couldn't dispose of the dollar plan and solve his labor problem if that were all, because he could work out an agreement and the matter of dollars and the share of the income could be considered settled before the year begun. But, of course, the reason why that doesn't work is because what I am talking about means that the moment you bring a man's platform of self-respect and also the matter of the man's ladder for a successful career into the situation, then you bring in fear and hope and pride, and with it, of course, the possibility of all sorts of hurt feelings, hurt feelings particularly with respect to that whole matter of the ladder.

"A great many of the strikes that are heralded in the papers as being nothing but the wish of the workers to enjoy more money for less work represent a maladjustment of the rungs of the ladder. They have nothing to do with dollars and cents really; they have nothing to do with the platform of self-respect; they affect only the ladder."

Mr. Williams cited the case of a textile strike, where one class of skilled workers charged that pay had not risen in proportion to the cost of living. Investigation showed that the real grievance was the fact that another class of unskilled workers on piece-work were earning more money than the skilled workers who were paid hourly rates. Settling this grievance ended the strike.

In recent years, he said, the income of unskilled workers has been coming up, while the skilled worker's pay has changed little. This has been due largely to the enrollment in the C. I. O. of millions of unskilled workers who wanted to insure their jobs. The A. F. of L., on the other hand, said Mr. Williams, is composed largely of workers who want both security and opportunity. This confliction of purposes of the two unions, will, in his opinion, result in many strikes.

Mr. Williams said that "history has shown that time after time in the last 75 or 80 years in America this thing has happened, that following a depression the skilled and the unskilled men have come down to fight together, hand in hand for the protection of the platform, for the protection of any job at all. At that time the public has hailed the coming of the new scheme and talked about solidarity of labor as though it were an entirely new and permanent affair, only to have prosperity come back with employers willing to offer renewed differentials to the man of skill, with the further result that the man of skill begins to feel that after all he is interested in these differentials and must say good-by to these unskilled people.

"Another difference in these two classes of workers," he said, "is that an unskilled worker can leave one job and get another one somewhere else that is just as good. The skilled worker must work for years to achieve his present position and it is almost impossible for him to find a job somewhere else that is just as good. For this reason, said Mr. Williams, oversimplification of labor problems by grouping the various labor classes would be a mistake, as it would remove the present incentives to success and put obstacles in the way of good employer-employee relations. Workers in this country can not be grouped into one working class as they are in Europe, and for this reason, he said, we can learn little from European countries on this subject.

In San Francisco, Mr. Williams said, employers have had so much labor trouble that they have formed an association to take care of such troubles, sign agreements, etc. This method has apparently worked out in this instance, but he does not believe it is the solution.

"Acceptance of the class lines of Europe, if adopted here, can not fail to destroy the ladder, to destroy opportunity, to limit production by putting it on the basis of class conflict, and can not fail to limit the buying power of the worker and to lower, in the course of time, the whole living level of the workers, and it is going to mean that one of these days the American worker will think himself very lucky if he can enjoy no longer the American worker's automobile but instead the British worker's bicycle."

Mr. Williams believes that the present plan of giving the worker a higher, more stable platform of regular work, without the ladder of opportunity is the result of a defeatist attitude toward labor. This attitude, he said, with the dollarization of the working man's wish for the job and the Europeanization of our whole working man's status, leads to the third and most serious threat. It gives the politician the opportunity to control him as a member of a working class rather than as an individual, considerably simplifying the vote-getting process. In Europe, said Mr. Williams, politicians have discovered that controlled taxation is an easy way to share the wealth and are using this as a bait for votes. The

politicians in this way offer what looks like a benevolent spiral but which, said Mr. Williams, turns into a vicious circle.

"What is happening is that in hard times the government is able to say, 'You are in very bad shape, we will give you W.P.A. funds and all sorts of relief, etc.' That means, of course, that they have to raise taxes. The higher the taxes go, the harder time enterprise has to carry on; the greater the difficulty of enterprise, the fewer jobs, the more unemployment; the more unemployment, the greater the political pressure upon larger and larger governmental grants; the more governmental grants, the higher the taxes, the less enterprise, the more unemployed, etc., clear on all the way down."

Exalting dependence on government and disparaging enterprise, he said, lead ultimately to dictatorships. He further stated, "I am inclined to think, just as Hitler has indicated, that to be a good dictator you must unite your people in hating somebody. . . . There is a question whether we haven't been going on for a number of years trying to make the ordinary citizen hate the business man and the giver of jobs.

"At any rate to-day, as I see it, the working man is in such danger as he has never been before faced with in all American history, because we are being very largely persuaded to adopt all sorts of alibis, alleged substitutes for the job; W.P.A. relief and seniority and short weeks and agreements and Townsend plans. What is the basis of all those things? Why are they attractive? They are simply ways of increasing the number of jobs by some other method than through the increase of enterprise. Why do we want the married woman off the job, for instance, the woman with a husband? Why should there be talk about that to-day? All because we have as a people and as a government accepted as a permanent condition of American life from here on out a scarcity of jobs, a permanent scarcity of jobs, a permanent situation in which we are never, in the belief of most of our citizens to-day, going to have enough jobs to go around, and we are being persuaded that that is too bad; nevertheless we will have a secure platform, even though the ladder is gone, and we will get by and share.

"But if what I have been saying about what it is that the worker has in his mind when he prays for the daily job—when I have in mind that he wants a platform for the basis for the support of his self-respect and a ladder for the possibility of a career—is true, then this thing is absolutely certain, that in all the world there is no substitute for a man's job except another job."

L. P. Price, Ready-Mix Concrete Co., Ltd., Honolulu, T. H.; R. C. Crumbaugh, E. I. DuPont Co.; A. K. Rueker and R. A. Hemphill, Weston & Brooker Co., Thomson, Ga.

It is not enough, said Mr. Williams, to give the worker shorter hours, unemployment insurance, etc., as the worker wants even more to have a full-time, self-respecting job. The real solution of the problem, he believes, lies in a friendly coöperation between the government and business, but this would not be good politics so it is not being done.

Mr. Williams believes the salvation lies in the ability of the average worker to arrive at a reasonable, wholesome point of view if given time to do so. He cited conditions in Sweden and France, where the workers have learned that shorter hours and higher wages raise prices so that nothing is gained. They are now thinking more in terms of annual income.

In this country, he believes, the public sentiment has already turned against Communism, sit-down strikes and the C.I.O., and the leadership of the employer is becoming more important. He advised getting closer to the employees and treating them as an important part of the industrial machine.

"We all think too much about how much we pay an hour. What we ought to be saying is, how much do we get an hour in return for what we pay, and I am perfectly sure that that means there is no such thing as the solution of the problem, then, in terms of good operation except on the basis of a cooperative feeling between the man who pays the money and the man who gives the work for which that money is paid.

"I don't care whether all the political leaders or all the highbrows in the world would like to persuade us that the relationship between you and your workers must be the relationship between a working class and an employer class; it will never bring the answer. It will never bring the answer in terms of the sort of happiness that the worker himself wants, to say nothing about the terms of the values and the low costs in combination with high wages that you want to have for your own self-satisfaction. . . .

"We as citizens of the United States have fallen down on our job unless we understand exactly why the worker prays for the daily job, why that means that there can be no substitute for it whatever except another job, and then do our level best to change the whole point of view, to revive the courage of America, and give this worker what he wants, the answer to that prayer, because if we can't do that, then we can vote money, we can cut jobs in two, we can scatter around the pieces and we can adopt a Townsend Plan and get the old fellows off the job and give their places to the youngsters, we can do everything in the world and it will avail us naught."

The meeting on Wednesday afternoon was presided over by Otho M. Graves, General Crushed Stone Co., Easton, Pa. Mr. Graves introduced the first speaker, Frederick H. Gross, assistant engineer, Park Department, New York City, whose subject was *Limestone Screenings and Stabilized Emulsion as Used in the Development of the Park System in New York City.*

Mr. Gross first briefly reviewed the work done during the past four years by his department. This included 340 modern recreational centers, the rehabilitation and modernization of about 200 old parks, and the construction of several new parkways. Many types of construction were involved in this program, he said, but of greatest interest was the type of construction used in the walks, playgrounds, roller-skating rinks and tennis courts.

After considerable study it was decided that the ideal surface was a cold asphaltic bituminous mixture of a texture known as fine asphaltic concrete in which all the stone aggregate passes a ½-in. mesh. This top surface was laid 1½ in. thick when rolled. About 300,000 tons of this mixture have been used.

Various types of base courses were also tested, said Mr. Gross, among them 6 in. of cinders and a 4-in. cinder concrete base. The first type resulted in excessive maintenance and the second also proved to be unsatisfactory, largely due to a wide variation in the quality of the cinders received. A 3-in. pre-mixed bituminous macadam base was also tried. This mix had a bitumen content of only 3½ per cent. and the stone was mostly between ¾ in. and ⅜ in. in size with a small percentage passing a No. 40 screen. This type was abandoned because it was difficult to work and also because it had to be delivered from asphalt plants

at a higher cost than other types made on the job with W.P.A. labor.

Experiments were then conducted with stabilized bituminous mixtures using the aggregates available in the vicinity of New York. According to Mr. Gross, these included sand, gravel, various sizes of stone, cinders, slag, limestone screenings and dolomite screenings. Mixtures were made with these aggregates used singly and combined in various proportions, with both weatherproofing and stabilized emulsions. Mixing, he said, was done at a plant in a pug-mill and the mixtures were hauled 5 or 6 mi. in trucks. It was found that only the stabilized mixtures with limestone or dolomite screenings arrived at the job thoroughly coated. These also were the only mixtures which held together after being laid and rolled.

It was then decided to concentrate on these two mixtures and determine the best gradation of screenings, the correct percentage of stabilized emulsion, etc., in order to obtain the ideal mix at the lowest cost. According to Mr. Gross, previous work along this line by A. T. Goldbeck, engineering director of the association, and C. L. McKesson of the American Bitumuls Co. was of great help. Two grades of screenings available in the vicinity of New York were found to be suitable for this purpose. One was a red limestone, 100 per cent. passing through ½-in., 20 to 40 per cent. through 20-mesh, and 5 to 15 per cent. through 200-mesh screens. The other was a white limestone, 100 per cent. passing through 4-mesh, 40 to 60 per cent. through 20-mesh, 25 to 40 per cent. through 100-mesh, and 15 to 25 per cent. through 200-mesh screens. The latter was eliminated because it produced too smooth a finish.

Further tests, said Mr. Gross, showed that the best results were obtained with a depth of 4 in. loose or 3 in. rolled out with 16 gal. of asphalt emulsion stabilizer and 6 gal. of water per cu.yd. of screenings. Such a mixture, he said, can be rolled within 2 or 3 hrs. in hot weather or longer in cooler weather. A vacuum machine was successfully used to extract the water during freezing weather, allowing rolling within 1 hr. The cost of the above base in place, 3 in. thick when rolled, was 70 c. per sq. yd. and the actual cost of the materials was about 36 c. per sq. yd.

According to Mr. Gross, the park department has been buying this mixture from commercial producers and from contractors. The producers deliver it in mixer trucks from their plants and the contractors mix it in 1-cu.yd. paving mixers at the site. The same base and top surface have also given good service on service roads subjected to heavy truck traffic.

The subject of the next address was *Highlights in the Field of Current Federal Legislation*. R. S. Smethurst, associate counsel, National Assn. of Manufacturers, presented this paper in the absence of John C. Gall, general counsel. After commenting on the various subjects before the Congress, he said that the most important is labor legislation.

"On the subject of labor disputes," he said, "it now appears we may expect suggested amendments or supplemental legislation from three sources: first, direct amendments to the National Labor Relations Act itself; second, the request for supplemental legislation growing from the investigations carried on by the La Follette Civil Liberties Committee; and, third, an indirect form of amendment to the National Labor Relations Act by modification of the so-called Walsh-Healey public-contracts law. Of course, the amendments in the first category are of primary importance and interest at the present time, namely, direct amendments or modifications of the National Labor Relations Act. To date two bills have been introduced in the Congress dealing with the subject: first, a bill introduced by Senator Walsh, of Massachusetts, containing amendments proposed by the American Federation of Labor; and, second, a bill introduced by Mr. Anderson, of Missouri, proposing a substitute for the existing National Labor Relations Act. . . .

"During the past two years complaints against the National Labor Relations Act on the part of the American Federation of Labor have generally revolved around two points. The A. F. of L. has charged during the past two years that the board has favored the C.I.O., first by discouraging the use of the craft as the appropriate unit for collective bargaining; and by delaying requests by A. F. of L. unions for certification to give the C.I.O. an opportunity to get organized; and second, that the board has nullified or otherwise interfered with contracts made by unions affiliated with the A. F. of L. . . .

J. T. Turnbull, E. I. du Pont Co.; H. E. Rodes, Franklin Limestone Co., Nashville, Tenn.

"Their specific amendments include, among others, the following: They would provide expressly by law that the craft unit should be the appropriate unit in all cases where there is a craft. They provide, secondly, that on the request of any labor organization, the board shall be required as a matter of law to conduct an investigation for the purpose of certifying representatives entitled to speak for all the employees in the appropriate unit. At the present time the board has discretionary authority; it can either proceed after a petition for certification had been filed or it can ignore it and let the matter rest until sometime in the future. This proposed amendment would make it obligatory on the board to proceed and certify any union found to represent a majority.

"Their second complaint is the charge that the board has interfered with existing contracts. Several amendments are now offered to eliminate that alleged abuse. First, they suggest provisions which would encourage further the use of the closed-shop contract, or the ability of labor to win acceptance of a closed-shop agreement with employers. In other words, they would permit a closed-shop agreement even before an organization had been certified as representing a majority of employees, if at the time it did as a matter of fact represent a majority for a unit deemed by the contracting parties as appropriate. Second, the board would be denied authority to nullify any existing labor agreements unless it could be demonstrated that they were with a company union or with an agency not representing a majority or which by their terms denied exclusive representation. In other words, practically any existing contract with the A. F. of L. would be protected from any interference whatever by the National Labor Relations Board. They have in this connection proposed another amendment, an amendment to cover the situation where an agreement is entered into with a union and then during the course of six or eight months affiliation in the union shifts, members drop out, form another union, join the C.I.O. or something like that, until two or three months after an agreement has been negotiated just a shell of the former organization remains. The A. F. of L. now proposes this amendment which would provide that where there was a shift in membership, the union with which the contract was made would have a vested interest in that contract and it could not be terminated, and that union would not be deprived of any of the benefits of the act for a period of one year from the date the contract was

executed or until the first year of its operation had expired. In other words, they are given a legal right to continue the contracts in effect even though the union no longer represents the majority of employees.

"As supplemental to this they have proposed an amendment to permit absolute intervention by a union in any controversy in which it may have an interest.

"Some decisions of the board during the past two years involving A. F. of L. unions have brought out the contention that some of those unions have been supported or aided by employers in obtaining membership. The employer may have indicated that he preferred this union as against that, or he may have actively enlisted members for them. In those cases, some of them, the board has held that while that kind of support fell short of domination or interference with the formation or administration of a labor organization, it did constitute a form of interference with the right of employees to select their own organization. In such cases the board would not order the union disbanded as it would in the case of an employee-representation plan but simply order the contract to be set aside or order the employer to cease such activities. Perhaps the most important of such cases was the Consolidated Edison case which went up to the Supreme Court. Now the A. F. of L. proposes a change in Sec. 8 of the National Labor Relations Act, the section defining unfair labor practices, which would make it permissible for an employer to encourage membership in a labor organization so long as it was not accompanied by actual discrimination or coercion, or actual threats of discharge.

"Along the same line they have proposed an amendment to permit the expression of opinion by an employer on matters of interest to the public or to his employees; in other words, an amendment providing that nothing in the act shall be construed to deprive an employer of the right to express his own opnion, provided it is not accompanied by coercion, intimidation, threats, etc., but all for the purpose of permitting an employer to speak in favor of one union or another, so long as it was not a company-dominated union as defined. . . .

"There are some of these amendments, however, which in my own judgment, might make the law worse than it is at the present time. Certainly they would not improve it. They would provide specifically that the board would have no authority whatever to intervene in anything that could be described as a jurisdictional dispute, that is any dispute between unions affiliated with the same parent body. As a matter of fact, the board has adopted that as a policy, but, anticipating a change in personnel of the board in the future, that policy could be changed. This amendment is designed to write into the statute a prohibition against any intervention or any interference whatever in jurisdictional disputes.

"The amendments also provide, as I have indicated, for the right of any union involved in a proceeding or affected by a proceding by the labor board to intervene in the hearing. At the present time that is left to the discretion of the board. About the only comment to be made on that is that, if unions are given the absolute right to intervene in a proceeding so that in effect you have the government and the union on one side prosecuting the employer, it is going to increase the size of the record and it is going to increase the expense of these labor board cases.

"These amendments would also change the unfair labor practices section of the act, and instead of prohibiting discrimination for the purpose of encouraging or discouraging membership in a union, or any practice which interferes with, restrains or coerces employees in the exercise of the rights given by the Act, they propose to prohibit any act of coercion or restraint for the purpose of hindering the exercise of any right created or affirmed by the Act. That sounds perfectly innocent on the face of it, and yet this law contains a provision that nothing in the Act shall be construed as interfering with or impeding in any way the right to strike. Superimposed on that tney propose this provision prohibiting any activity intended to hinder any right created or affirmed by the act, so the affirmation of the right to strike could be brought within this board declaration against unfair labor practices and it might not be necessary to show in the future that any activity of an employer interfered with the right of an employee to join a union, if it interfered with any activity in the exercise of the right to strike. This proposal likewise requires further clarification. . . .

"In addition to these amendments offered by the A. F. of L. another bill has been introduced by Mr. Anderson, a member of Congress from Missouri. His bill is offered as a substitute for the existing act, and in large part would carry over the form and substance of the present law. The main change would be that the board would be deprived of the right to proceed with hearings and to find any employer guilty of violating the act. That job would be assigned to the various federal district courts throughout the country. The board would receive complaints or charges from employees or unions; if it saw fit it would issue a formal complaint and that formal complaint would be filed with the appropriate district court of the United States. That court would proceed to hold a hearing and make its findings and conclusions, and from that decision an appeal would be taken in much the same manner as is now done under the present law. But the district court would be substituted for the labor board in this important matter of determining whether an employer had violated the act. . . .

"About three months ago the C.I.O. announced that they were going to press for their blacklist amendment they offered last year, namely, to blacklist contractors who failed to comply with the National Labor Relations Act, and in addition they were going to impose as another condition to the receipt of government contracts a requirement that the contractor upon demand of a union must agree to a closed-shop contract and check-off. I don't know whether that last announcement has destroyed the possibility of their first proposed amendment or not, but it may be significant that neither of these amendments has been offered this year. Of course, that doesn't preclude their being offered at a later date when these amendments are brought up for consideration. . . .

"While there have been several bills introduced already to amend that act, the Administrator has refrained from taking any definite position on any specific amendments. However, he has suggested for possible consideration four or five amendments, some of which are rather significant. He submitted an annual report to the Congress and he also appeared before the House Appropriations Committee for an increase in the appropriation for administration of the act during the next fiscal year, and in that appearance before the committee and in the report he has made certain suggestions for consideration of amendments. The first of these was on the question of higher salaried employees. Of course, that problem has been one of the most difficult to meet in the short period during which the act has been in effect, but he has suggested that possibly employees earning a regular monthly salary of a definite amount, or so much a year, might be exempted from the limitation on hours.

"He has also suggested that the act might be amended so that when he or his staff gave an opinion that an employer was not subject to the act in a given case, if the courts should later decide to the contrary there would be no penalties accruing in the meantime.

"He has also suggested the advisability of considering an amendment

(Continued on Page 60)

CUTS LOADING EXPENSE THIS NEW WAY

Loaded bucket being hoisted into position in the quarry.

Plant of the Quarry Products Co., showing stock-piling conveyor.

Bucket-load of stone being discharged into the primary crusher.

THE Quarry Products Co., Menasha, Wis., operates a small crushed-stone plant, which is typical of hundreds of small operations in this and other states. For this reason a brief description of the manner in which this company has solved the problems created by changing specifications, improved operating methods, etc., should be of interest to many.

The quarry was first opened in 1870 for the production of building stone. In 1880 the property was taken over by Jens Jorgenson under whose management a crushed-stone plant was built in 1910. In 1927 Mr. Jorgenson sold the property and the new owners built the plant now in use. In 1929 new equipment was installed. The present name of the company was adopted in 1921 and in 1931 it was incorporated. In 1935 the plant was taken over by the present owners. New crushing and screening equipment was installed a few years ago.

The company's deposit consists of 80 acres just outside Menasha. The overburden consists of clay which is removed with the quarry equipment during slack periods. The top 6 ft. of the deposit is shale, which is run through the crusher and sold for secondary-road construction. The crusher-run product varies from 30 to 40 per cent. through ¼-in. and binds well without the addition of clay. Oiling improves roads made of this material, but is not necessary.

Under the shale is hard blue limestone extending to an unknown depth. Gardner - Denver jackhammers and Timken detachable bits are used for drilling a 20-ft. face in two benches. According to W. C. Friedland, secretary, treasurer and manager of the company, these drill bits have proved to be much more economical than drill steel. The bits, he says, give three times as much footage per sharpening and the money invested in steel is much less. Trojan explosives and caps are used for the blasts, are detonated electrically.

Until 1934 shovel loading and truck haulage had been used in this quarry. About that time smaller sizes of stone came into vogue and the finer crushing necessary resulted in a considerable decrease in the capacity of the plant. The shovel was found to be too expensive for only part-time operation, and hand-loading into trucks was adopted. This method was also found to be unnecessarily expensive.

Early in 1939 the loading problem was solved by the purchase of a Demp-

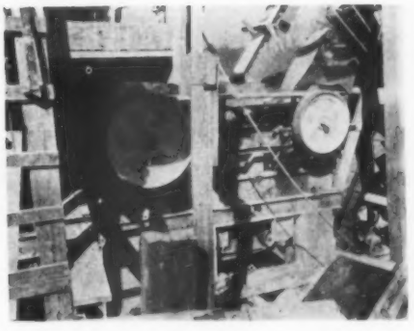
(*Continued on page 60*)

The new crushed-stone ballast plant with chute from quarry to crushers at left. Since this picture was taken the equipment has been rearranged.

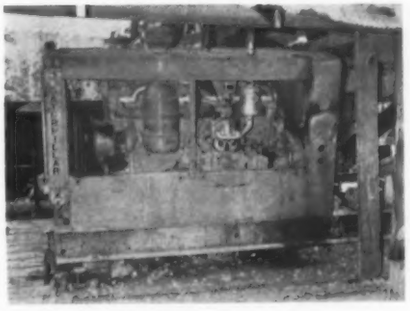
Cars Move by Gravity Out of Ballast Quarry in Arkansas

by W. E. TRAUFFER

LEFT: A view of the quarry showing the drill, shovel and the haulage system now being replaced. BELOW: The vibrating screen in its old position.



A close-up of the roll and jaw crushers.



The Diesel engine which operates the entire plant.

RAILROAD ballast has, in recent years, accounted for only a small percentage of commercial crushed-stone production. Few plants other than those owned and operated by the railroads produce ballast exclusively. One of these plants, owned and operated by Walter J. Ehrler of Galena, Ill., is located on the Rock Island Rwy., about 5 mi. north of Malvern, Ark., and only 20 mi. southeast of Hot Springs National Park. It supplies ballast for the branches of this railway in the states of Arkansas, Louisiana, Kansas and Oklahoma.

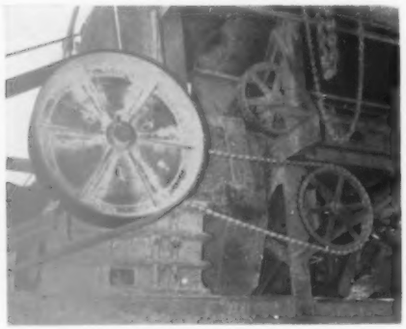
The deposit is owned by the Rock Island Rwy., which has produced railroad ballast from it since 1910. The original plant was replaced in 1925 by a larger plant, which was in turn replaced by the present plant early in the summer of 1938. This new plant was designed by the Universal Crusher Co. to conform to Mr. Ehrler's general plans and this company supplied all the equipment. The plant averages in 10 hr. 500 tons of stone passing through a $\frac{7}{8}$-in. opening. The fines are not removed as they make a good binder. Improvements are now under way which will considerably increase the capacity of these operations.

A gasoline well-drill is used to drill blast holes in a single row on the 40-ft. face. Shots are made with 40-per cent. gelatin explosives, battery-fired. Because of the unusual character of the rock and variations in the formation the shots are planned carefully. Its hardness makes this rock extremely hard to drill, but its brittleness results in about 15 ft. of back breakage on each shot. An average of $3\frac{1}{2}$ tons of rock per lb. of explosive is obtained. Secondary breakage has been done by mud-capping, but secondary drilling and shooting are now employed. An Ingersoll-Rand compressor and jack-hammers are used.

An Erie $\frac{3}{4}$-cu. yd. steam shovel formerly loaded the stone into end-dump cars of a "semi-automatic" haulage system. This system consisted of two mules, two cars and two tracks, and it

worked as follows. A mule pulled an empty car up-grade to the shovel on one track while the other car was being loaded. The loaded car was then allowed to coast down-grade on the other track to the dumping point with a rider applying the brakes. When the empty car was "spotted" for loading, the mule strolled back down the grade to wait for it. Perfect as this system was, it is now being replaced with motor trucks, as the haul is now 400 ft. long and is being increased steadily.

Stone was dumped from the cars down a 40-ft. wooden chute into a hopper, from which a Universal apron-feeder discharged it into an 18-in. by 36-in. Universal roller-bearing jaw crusher. The minus 1½-in. product of this machine was carried by a 15-ft. belt-conveyor to a 37-ft. continuous-bucket elevator. All the sizing was done on a 3-ft. by 8-ft. Simplicity 2-deck vibrating screen with 2-in. and ⅞-in. openings. The stone retained on both decks dropped on a 20-ft. belt-conveyor, from which it was discharged through a chute into a 40-in. by 20-in. double corrugated-roll crusher. The product of this crusher was discharged on the first mentioned belt-conveyor, and was returned over the screen. The material passing through the bottom deck of the screen was finished product and was discharged into a wooden bin of 1-car capacity.



The primary jaw crusher with feeder at right.

When the present improvements are completed the product of the jaw crusher will be discharged on a 30-in. by 26-ft. belt-conveyor which will feed the vibrating screen. This screen has been moved from the top of the bins to a point below the crusher. The material retained on the top deck of the screen will be chuted into a new 9-in. by 36-in. Universal roller-bearing jaw crusher and the material from the second deck into the 20-in. by 40-in. roll crusher. A short conveyor from each of these crushers will carry their products back to the main feeder conveyor and over the screen. The material passing through the bottom deck of this screen will be delivered by a 24-in. by 34-ft. bucket-elevator into the plant bins which have not been changed.

There is gravity track storage for 15 cars above the plant and more than that below it. Switching is done once daily.

All the equipment in this plant was driven from a 6-cyl., 125-hp. Caterpillar Diesel engine. The jaw crusher was driven by a flat belt from the engine and the feeder was chain-driven from the crusher. A clutch on the feeder drive-shaft enabled the operator to control the rate of feed. The roll-crusher was also chain-driven from the jaw crusher. The crusher belt-conveyor and the elevator were driven from the roll-crusher. The return belt-conveyor and the screen were driven from the elevator, the latter at 1,200 r.p.m. A similar system of drives is now being used.

According to M. L. Murray, superintendent, the engine consumes 3 gal. of Standard Oil Co. fuel oil per hr. The tank-wagon price of 9 c. per gal. is now being paid, but a storage tank will be installed so that larger quantities can be bought at a lower price. Mr. Murray is an employee of the railroad but has been on leave of absence since January, 1923 to superintend the operations at this quarry.

Crushed Stone (from page 57)

permitting the averaging of hours where employees earn a certain stated amount per month or per week or per year, so that over a period of a month they wouldn't work over 44-hr. a week but would be permitted to work 56-hr. this week and 36 the next, or any combination which over the period of a month or two months would average not to exceed 44.

"He also called attention to this so-called 'pious hope' provision in Sec. 18 of the act to the effect that nothing in the act shall justify a reduction in wages, and he has suggested that the Congress might wish to consider whether penalties should be imposed for the reduction in wages above the minimum required by the statute. In that connection, a bill has been introduced in the Senate by Senator Maloney of Connecticut. Among other things he would freeze wages at levels in effect at the time his bill was passed and require that they be maintained at that level until changed by collective agreement."

Two board-of-directors' meetings were held in connection with the convention—one of the outgoing board before and one of the new after it.

The 1940 convention of the association will be held at the Jefferson Hotel, St. Louis, Mo., January 29 to 31. The summer meeting of the board will be held at the Westmoreland Country Club, just outside New York, at a date to be announced later.

The possible exemption of the crushed-stone industry from the provision of the Fair Labor Standards Act of 1938 was discussed only briefly, as the subject was given full consideration by the convention.

Five new members were admitted to the Manufacturers' Division — King Powder Co., Lima Locomotive Works, Pettibone-Mulliken Co., Smith Engineering Works, Stephens-Adamson Mfg. Co. Roy Wills of the Lima Locomotive Works, was elected chairman of the Manufacturers' Division and a member of the board of directors.

In his report to the board Administrative Director J. R. Boyd reviewed the association's activities with respect to legislation and finances. He told of the request for information regarding the industry's wishes on the question of prevailing minimum wages for the crushed-stone industry made by Administrator L. Metcalfe Walling of the Division of Public Contracts. He wanted to know (1) whether a great many regional prevailing wage differentials are necessary or whether the number set up under the N.R.A. code is sufficient, and (2) whether it will be necessary to set up metropolitan and rural differentials within those areas. The decision was left to the executive committee.

A. T. Goldbeck, the association's engineering director, gave a brief report on the many activities of his department. He told of the special investigations made for members and of the study of seasonality in the crushed-stone industry which formed the basis for the association's plea to the administrator of the Fair Labor Standards Act of 1938 for exemption from its provisions.

Menasha (from page 58)

ster Dumpster mounted on a Dodge truck. The Dumpster handles four 1-cu. yd. buckets and with 6 men loading and a 1,000-ft. haul no difficulty is experienced in keeping the plant supplied at its capacity of 200 to 225 tons in an 8-hr. day. Occasionally, when large stone is being produced, the plant puts out 400 tons daily without overtaxing the haulage system.

Stone is dumped from the buckets into the Smith Engineering Works Telsmith No. 10 gyratory primary crusher. A Telsmith 2-deck vibrating screen is used to size the crusher product. The oversize goes from this screen to a Telsmith No. 5 gyratory crusher, the product of which is returned to the screen. Six storage bins have a total of 700 cu. yd. capacity. There is also a stock-piling conveyor for excess material of any size. Some screenings passing through ¼-in. openings are sold for agricultural limestone.

By Z. H. MISCHKA

Statutes Affecting Pit-and-Quarry Operators Appear in Legislatures

PROPOSALS commanding the attention of the pit and quarry industries wended their way through legislative mills of many of the 43 states where lawmakers started deliberations in January. While bills were still being poured into legislative hoppers in large numbers up to late February, legislative progress on a number of proposals in several states was sufficiently advanced to predict their outcome safely.

In a few states legislatures were engaged in a last-minute rush to complete action on pending measures before adjournment forced by statutory limits placed on the length of their sessions as PIT AND QUARRY went to press. In a number of states legislative clocks will be stopped at the adjournment hour while lawmakers continue in closed sessions for hours or days to complete their business.

Twenty-three state legislatures, including several that adjourned in late February, are completing their work this month. In the remaining 20 states and Florida, where the legislature will convene April 4, lawmakers will complete their work later in the spring and summer months. Legislatures not meeting this year are those in Kentucky, Louisiana, Mississippi and Virginia.

The general trend this year, as in years recently passed, is to write new and additional statutes affecting the pit and quarry industries. Many of the bills receiving consideration are in the field of labor legislation, with state wage-and-hour measures and labor-relations acts, similar to the national Fair Labor Standards Act of 1938 and the Wagner act, leading the field.

The pit and quarry industries, along with other business groups, have taken some encouragement from the defeat of a Montana wage-hour bill by a House vote of 59 to 34 in the first decisive test of this legislation this year, and from the indication of certain death of such a measure by the Indiana House when, on February 16 by an overwhelming voice vote, a move to force immediate consideration of the bill lost.

Like many other state proposals receiving consideration, the Montana measure was more drastic than the Federal act that covers interstate business in that it sought to make mandatory on July 1, this year, a 40-c. an hr. wage, with a 50-c. an hr. wage to become effective in January, 1945. A 42-hr. week would have become effective this year, with a downward revision of the maximum hours to 40 a week in October, 1940. The Federal law stipulates a minimum hourly rate of 25 c. for the first year, 30 c. per hr. for the next six years, and a minimum of 40 c. an hr. after the expiration of seven years.

J. Otis Mudd, Missoula, speaking against the Montana measure on behalf of a large group of trades and industries, told a legislative committee that business could not afford to meet the standards imposed by the bill. "You must remember labor is not the only 'forgotten man,'" he said. "The small business operator, as the governor said in his message to you, is also a forgotten man." Mr. Mudd referred to Gov. Roy E. Ayers' message to the legislature, in which he warned against placing additional taxes on business.

"I do not now recall any Montana business, large or small, against which higher levies can be made without imposing burdens which might easily be a hindrance to progressive enterprise", the governor said. "In the family of 'little businessmen' I can go you one further, for in this class I can recall many who would be compelled to liquidate if any additional levies were placed upon them. They are among the 'forgotten men' in the field of taxation."

Rep. Roy J. Harrison, of Attica, chairman of the Indiana House labor committee, against whom the move to force immediate consideration of that state's wage-hour measure in mid-February was directed, declared the bill "vests dictatorial power in the state commissioner of labor" and it would put men out of work instead of creating more jobs.

"We don't know whether it is time to make Indiana a guinea pig or whether we should let some other state take the step first", Mr. Harrison said. "There is a question now on how we are going to put men back to work. The wage-hour bill doesn't give the man on relief any encouragement. The law may throw more men out of work. The labor committee is trying to decide whether the wage-hour law will encourage or discourage business. I think it will discourage business. We must consider whether it will hurt the little fellow, whether it will put him out of business. Personally, I think it will."

California probably holds the distinction of having the largest number of labor measures before its state legislature at the present time. Among them are bills to enact a labor-relations law similar to the national Wagner act; for a state wage-hour law; to make the unemployment compensation benefit law apply to employers of one or more persons in place of the present four or more; to eliminate the employee's contributions to the unemployment insurance fund and place responsibility for full support of the fund on the employer; to prohibit issuance of injunctions against strikers in labor disputes unless it could be shown that the employer would suffer "irreparable damage" unless the injunction was issued; would prohibit employers' blacklists and penalize employers who made derogatory remarks about workers formerly in their employ; would prohibit anti-picketing ordinances by cities and counties; would increase the minimum wage for women workers from the present $16 a week to $20 and lower maximum hours from 48 to 44; and would establish a health-insurance program for workers financed by pay-roll taxes, workers contributions and public funds.

Similar measures, while not in as great a number, are before legislatures of the 42 other states. Space does not allow separate mention of individual wage-hour and other labor measures affecting the pit and quarry industries except where they already have been subjected to a test vote that may indicate their passage or rejection.

A definite picture of proposals under consideration receiving the attention of the industry appears in the following

state-by-state summary. Where action had been taken by a legislative committee or a branch of the legislature up to the time PIT AND QUARRY went to press, such action is indicated. In many cases, however, bills sponsored by the industry, as well as those introduced by groups and individuals outside the industry, had not proceeded beyond the introduction stage.

Arizona.—Bills introduced during the past month, neither of which had received decisive action, would increase the privilege sales tax on limestone, sand, gravel and other mineral products from 1 to 2 per cent., and would provide workmen's compensation for occupational diseases.

Arkansas.—The House, by a vote of 72 to 9, passed a bill to exempt from the severance tax sand and gravel taken from streams for use in highway building. It awaits Senate action. A pending House bill would increase the sales tax to 2 per cent. on quarrying, mining and smelting.

With three unemployment-compensation bills in the legislature, the Arkansas Federation of Labor has endorsed a House measure introduced by Rep. Holland, of Sebastian, which would provide maximum death benefits of $7,000. The act would be administered by a three-member board to be appointed by the governor.

After the House labor committee reported "without recommendation" a bill to create a state labor-relations board, endorsed by the American Federation of Labor, the bill's author announced its withdrawal.

California.—After three weeks given over to the introduction of bills, the California legislature adjourned until March 6 to allow members to study individual proposals. Little action was taken during the early days of the session.

Connecticut.—The Connecticut Federation of Labor has presented a 15-point legislative program that includes an anti-injunction bill; changes in the unemployment-compensation insurance law to bring employers of one or more persons in place of the present five or more under the act; changes in the workmen's compensation act to increase maximum benefits from $21 to $25 weekly; amendment to all laws that would hold a labor union responsible for acts of individuals or would term as an act of conspiracy any legal or just acts of members of organized labor in labor disputes; prohibition of a "kick-back" or the return of any part of a worker's wage in any form whatsoever; and a state labor-relations law.

Delaware.—A bill to abolish the industrial-accident board, established in 1917, and substitute a new workmen's compensation bureau is before the legislature. The new bill would increase compensation payments to low-salaried employees, and provide a more liberal adjustment of benefits payable to widows and dependent children.

Georgia.—A House bill introduced February 14 would create a department of natural resources, replacing several existing departments, including the department of forestry and geological development. It has been referred to the committee on privileges and elections.

Idaho.—The Senate killed one bill to create a bureau of industrial hygiene in the division of public health, but similar measures are still pending in both branches of the legislature. A wage-hour bill was introduced in the House in early February.

Illinois.—An organized labor-sponsored measure to increase workmen's compensation awards has been introduced in the House. Awards for injuries would be raised from 50 to 66⅔ per cent. of the average weekly wage.

Indiana.—A measure intended as a compromise for the general wage-hour bill has been given Senate approval. It would establish a minimum wage of 25 c. an hr., but makes no mention of maximum hours. It would become void if the national Fair Labor Standards Act became inoperative.

Sam Hadden, Indianapolis, secretary of the Indiana Aggregates Assn., and a group of industrial and business leaders told the Senate labor committee that a pending bill to increase workmen's compensation benefits would result in the use of more labor-saving machinery and would tend to drive out industries. The bill, as written, would raise the minimum payments for temporary disability from $8.80 to $12.15 weekly and the maximum from $16.50 to $24.75. Benefits for permanent disability would be increased from $5,000 to $12,375. After the hearing, the committee changed the bill to establish the weekly minimum at $10.01 and the maximum at $20.90, and the maximum permanent disability benefit at $10,500. It was reported without recommendation and awaits Senate action.

In answer to a legislative resolution introduced in January, Thurman A. Gottschalk, state supervisor of institutions, reported that very little material used in the $5,000,000 institutional building program was purchased outside the state. The resolution was introduced following a complaint that state limestone and other building products were being passed over in favor of products coming from other states.

Discovering that the tip of Lake Michigan in Lake and Porter Counties is the property of Indiana, state officials last month were preparing to levy a gross income tax on sand and gravel being dredged and taken to Chicago in large quantities.

Iowa.—A Senate bill would authorize condemnation of private lands to obtain gravel and other suitable material for secondary road surfacing.

Kansas.—A Senate bill would require purchasing agencies of all state institutions, boards and commissions to favor Kansas sand, gravel and other materials. A previously-introduced Senate bill would regulate contracts entered into by the state and local governments to specify preference to Kansas materials.

A House bill would prohibit blasting or removing the surface of the earth to extract minerals within 500 ft. of any cemetery.

Michigan.—Removal of sand, gravel or other minerals from tax-delinquent lands would be prohibited under terms of a bill passed by the Senate. It awaits House action.

Minnesota.—A House bill would permit condemnation by governmental units to obtain gravel for roads.

Montana.—A bill to kill plan No. 2 of the workmen's compensation law, which permits employers to carry insurance with private underwriters, was killed by the Senate. While the House saved by a small margin a bill to establish a labor relations board, placing it on general orders for debate, the Senate by a vote of 34 to 16 defeated a similar measure. Passage of the House bill by the lower body would result in its defeat by the Senate, it is indicated.

Pending bills would require employers to give employees a one-week vacation with pay after 12 months employment and a two-week vacation after 24 months employment; would make silicosis a compensable disease, and would set up an industrial hygiene board within the state board of health. The latter proposal is in line with recommendations made by an occupational-diseases committee of the state which recently completed an investigation. A pending joint resolution asks continuation of the study of occupational diseases by the commission.

Nevada.—Gov. E. P. Carville, addressing the legislature, called attention to the possible introduction of "labor legislation in connection with the minimum-wage law and other subjects" and asked that the matters be considered "seriously, with the view of having

progressive labor legislation passed".

A bill to require employers to subtract union dues from the pay envelopes of union members at their request was defeated in the Assembly, but a similar measure was introduced a day later in the Senate.

While a wage-hour bill has been drawn for introduction in the legislature, observers believe there is little likelihood that the measure will be passed because of the uncertainty of the status of the legislation, both nationally and in neighboring states.

New Jersey.—A House bill would penalize employers who fail to place proper safeguards around machinery by the payment of twice the amount of regular compensation.

New Mexico.—Pending bills would create the office of state safety engineer and inspector under the labor and industrial commission, and would require contractors to pay an additional 1 per cent. tax on stone, sand, gravel and other materials used in addition to the present 1-per cent. sales tax.

North Carolina.—The joint finance committee of the legislature amended the revenue bill submitted by the administration to provide exemption from the sales tax all sand, gravel, crushed stone, rock, granite, brick or hollow tile and rough and dressed lumber, excluding millwork. Similar exemptions were provided under the 1937 act, but it was proposed to eliminate them this year in order to increase state revenue by about $500,000.

North Dakota.—The House has approved an appropriation of $12,530 for a state geological survey.

Oklahoma.—A second measure calling for construction of a state cement plant has been introduced. A House measure, it would appropriate $1,000,000 for the project, which would be located on the lands of the state subpenitentiary at Stringtown.

A measure introduced a month ago in the Senate would create a state cement and asphalt plant at half the cost in Murray County, and authorize the sale of its products to state and local governmental units and farmers' associations. Both proposals await legislative action.

Oregon.—Faced with an adverse report by the House labor and industries committee on his bill to outlaw closed-shop contracts between employer and employes, Rep. C. C. Chapman has prepared a resolution to carry his fight for the open shop to the voters at the next election.

South Dakota.—The House approved a measure to divert profits from the state cement plant to the general fund. The bill, which as originally introduced would have created a special highway paving fund with the profits, awaits Senate action. The original bill embodies a recommendation of Gov. Harlan Bushfield, and, according to its proponents, would have kept the plant working full time supplying the demand for products in connection with increased highway paving.

Pending bills would exempt gravel trucks from the motor-carrier compensation law, and would give preference to South Dakota products in all public contracts.

Texas.—A House bill introduced February 13 would authorize the establishment of state manufacturing plants for road materials.

The pit and quarry industries are joining with other business and industrial groups in opposition to the administration's proposed 1.6-per cent. transaction tax, maintaining that it is, in effect, a sales tax several times multiplied.

Utah.—The Senate judiciary committee gave an unfavorable report to a Senate bill to give governing bodies of political subdivisions discretionary power to award contracts for state-produced or state-manufactured materials provided the bid of a home industry does not exceed the bids of outside concerns by more than 5 per cent.

A favorable Senate labor-committee report has been given to a state wage-hour bill.

Vermont.—Both A. F. of L. and C. I. O. labor groups have entered opposition to a House bill that would set up a new law for the conciliation and arbitration of labor disputes and repeal existing laws on the question. In a joint statement explaining organized labor's stand on the bill, Robert F. Sinclair, acting for the president of the Vermont Federation of Labor, and John C. Lawson, representing the C. I. O., said:

"Machinery for the conciliation and arbitration of disputes is contained in union contracts with employers and has worked very satisfactorily to both sides for a period of years. There is no compulsion by either party in carrying out this process. We find that through negotiations between employers and employees, mutually satisfactory settlements of wages and working conditions were reached last year.

"Reports from union representatives from all sections of the state who participated in these conferences state that they are of a firm belief that a better understanding and recognition of the problems of both management and labor was shown in these conferences. The day-to-day relationship between union and management in Vermont is much more satisfactory than it has been in years past.

"The enactment of the proposed bill would inject into this relationship the suspicions which characterized these relationships in years gone by and which the union has consistently worked to break down. Instead of helping management and labor relationships, we are of the firm opinion that the enactment of the proposed bill would have the opposite effect. We are unalterably opposed to compulsory arbitration or any part of it as indicated in the proposed bill."

Washington.—At executive request, the Senate rules committee introduced a bill changing the basic rate of payment on unemployment-compensation benefits from one-half of one week's salary to one-twentieth of the total salary earned by a worker in the best quarter of the previous year. The effect of the bill would be to increase the normal payment from 50 to 65 per cent., if the salary remains constant. The present minimum of $7 and maximum of $15 would remain in effect.

Other pending bills would authorize the state planning council to study all the resources of the state, requiring the preparation of master plans for conservation and development of all natural resources, would prohibit local anti-picketing, anti-parade and laws against meetings, and would make employers subject to misdemeanor charges if they employ at a lower rate than employees are entitled to by a statute or through collective-bargaining contracts.

West Virginia.—With the legislative session well advanced, observers were practically agreed that state wage-hour and labor-relations measures would fail of passage. Bills on both subjects were introduced early in the session.

A pending measure would prohibit the state and its subdivisions from using any material in public buildings manufactured in any state which forbids the use of the same materials in its own public buildings.

Wisconsin.—Following a legislative hearing, it appeared that a bill to confine picketing to persons in a labor dispute would have a chance for passage at the current legislature. The bill, which has been introduced in both houses, would make unlawful secondary picketing—picketing at any place but the actual scene of a labor dispute. Under the present law picketing can be carried on before places using materials obtained from a struck plant.

Wyoming.—The House, in committee of the whole, endorsed by a vote of 36 to 12 a bill to exempt employers of fewer than eight persons from the state unemployment-insurance law. The measure awaited final passage by the House and action by the Senate.

Trap-Rock Producer Acquires Fleet of Diesel-Powered Tractor-Trailers

The new Dieselized fleet at the quarry. Note skips and quarried material at the upper left.

TEN Sterling chain-drive tractors powered with Cummins Diesel engines are being placed in service hauling rock from Pennington, N. J., to Barnegat City, N. J., a distance of 77 miles, by the Pennington Trap Rock Co. The tractors will pull 17-ft. semi-trailers which will carry skips loaded with rock to be used in the construction of a mile-long jetty to protect the historic Barnegat lighthouse as well as the city of Barnegat. For many years, the southern sweep of the ocean currents through the inlet at Barnegat have been eroding the land on which the lighthouse stands.

Another view of the Pennington fleet.

Close-up view of one of the units.

Two stone jetties are to be constructed, one on each side of the inlet, and both extending out into the ocean. The rock will be loaded into the skips, and three skips will be placed on each semi-trailer. Since there is no road to the north jetty, the rock will be hauled to the southern side, where the skips will be lifted and conveyed across the inlet on cables strung between towers 150 ft. high. The towers and cables will support rocks weighing as much as ten tons.

The tractors will travel approximately 462 mi. per day, carrying 15 to 20 tons of rock, and it has been estimated that at least one year will be required to complete the construction.

Since the contract calls for a minimum of 400 tons per day, Sterling Model HC147-HB chain drives with Cummins engines were selected because of their dependability and low operating costs. An auxiliary transmission used in conjunction with a four-speed unit transmission provides twelve forward ratios and three reverse, making these units practical for various types of operating conditions. Road speeds up to 48 mi. per hr. can be obtained.

The Diesel engines are the Model HB-600 type supplied by the Cummins Engine Co., Columbus, Ind. These are 6-cyl. units of 150-hp. each.

Personal Mention

ARTHUR J. STRUNK of Nazareth, Pa., was elected president of the eastern district of the United Cement Workers at a conference attended by 2,000 cement-plant employees of the Lehigh Valley district at Bath, Pa.

J. J. BASSETT, superintendent, and JOSEPH CAVELETTO, chief clerk, Oglesby, Ill., plant of the Lehigh Portland Cement Co. were injured in an automobile accident while driving to Chicago recently.

JOHN H. MAYER, chief engineer of the Alabama Asphaltic Limestone Co., Birmingham, Ala., has been elected president of the Alabama section, American Society of Civil Engineers.

C. J. LARKIN, president, and all other officers of the Rock Island Sand & Gravel Co., Rock Island, Ill., were re-elected at the recent annual meeting of the firm's stockholders.

ROBERT W. LEA, who has been president of the West Virginia Coal & Coke Co., has been elected a vice-president of the Johns-Manville Corp. Mr. Lea will be in charge of finance, and will take over the position formerly held by ENDERS M. VOORHEES who left Johns-Manville to become chairman of the finance committee of the United States Steel Corp.

R. MCLEAN has been made manager of the truck-mixer division of the Jaeger Machine Co., Columbus, O. Mr. McLean, who recently resigned as executive vice-president of Transit Mixers, Inc., has been identified with the truck-mixer business for 11 years.

FREDERICK W. COPELAND has been elected president of the Sullivan Machinery Co. Mr. Copeland has resigned the presidency of the H. Channon Co., Chicago, to take over his new duties.

A. E. AINLAY for five years active in sales work for the Cummins Engine Co. has been appointed regional manager of the central region of his company. Mr. Ainlay will cover the states of Colorado, North and South Dakota, Kansas, Nebraska, Missouri, Illinois, Iowa, Minnesota, Wisconsin and a small part of Indiana. His Chicago office is at 4182 Clarendon Ave.

¶ DOING ONE THING WELL—like a Specialist—that's why the LEAHY "No-Blind" Heavy Duty Vibrating Screen is so often *called in* on special grading problems where accuracy and economy must go hand in hand.

¶ Every sand and gravel producer, who has to meet rigid specifications, should know the advantages of equipment which is built for his particular job of *fine screening*. The new Type C LEAHY Screens, the V-Belt Motor Driven or the Belt Driven Models, combine all the developments of 32 years of experience—with these outstanding results:—

1. Operating in the 90% efficiency range, and 97% not uncommon.
2. Only ½-hp required, due to perfectly balanced, friction-free mechanism.
3. Yearly maintenance expense for continuous operation averages less than 1% of the original investment.

¶ Get those extra profits that come from the higher capacities and lower costs of LEAHY Screens. Write for Bulletin No. 14-H.

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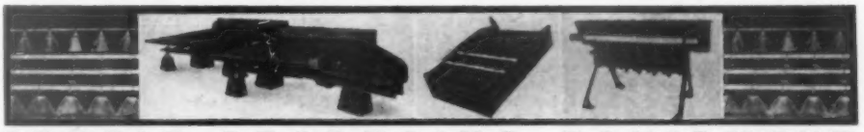

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LOW COST CRUSHING FOR 53 YEARS

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No Tipping on Slopes

Portable Hammer Crushers
(Ideal for Farm to Market Roads.)

Manufacturers of:
Stationary & Portable Rock and Gravel Crushing and Screening Plants—Single and Double Roll Crushers—Revolving and Vibrating Screens—Conveyors.

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Saves 10% to 15% in Fuel —90% in Lubrication.

Write for Bulletin "ROADS."

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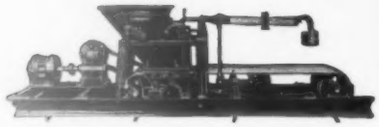


Weighing and proportioning material with 99% accuracy, Schaffer Poidometers are recognized throughout the cement industry as important equipment in modern plant control.

Schaffer Poidometers are automatic in action and will operate continuously or, with a mechanical weighmaster attachment, will provide batch operation.

This efficient weighing equipment is now saving thousands of dollars throughout the cement industry. Many leading plants are now saving money while obtaining greater efficiency with Schaffer Poidometers. Let us help solve your proportioning and feeding problems. *Write for catalog No. 5.*

SCHAFFER POIDOMETER COMPANY
2328 Smallman Street Pittsburgh, Pa.

SCHAFFER POIDOMETERS

RICHARD N. COOLIDGE, general manager of the Cumberland River Sand Co., Nashville, Tenn., has been elected to the board of directors of the American National Bank of Nashville.

KAY TODD, St. Paul attorney, has been elected to the board of directors of the Carney Cement Co. of Mankato, Minn.

E. M. HAMMOND, manager of the Gravel Products Corp., North Tonawanda, N. Y., had a narrow escape from death recently when the automobile he was driving crashed through a guard rail and plunged into the ice-coated Erie Canal. Mr. Hammond, although slightly injured, was able to crawl out of the car and make his way to shore.

JAMES M. GAGER, prominent Chattanooga, Tenn., citizen and head of the Gager Lime Mfg. Co., died recently at

James M. Gager

his home following a heart attack. He was 58 years old and a native of Sandusky, O., but moved to Chattanooga with his parents at an early age.

HANS H. MUEHLKE, 66, treasurer of the Lone Star Cement Corp., New York, N. Y., died at his home in Yonkers recently. He was a native of Detroit, Mich.

EDWARD H. GERBER, 55, head of the Del Paso Rock Products Co., Sacramento, Cal., died of a heart ailment recently.

FRED O. SMITH, vice-president of the Vulcan Iron Works, Wilkes-Barre, Pa., died recently.

CHARLES W. ROBINSON, 81, organizer and former proprietor of the Diamond Stone & Brick Co. with offices and plant on the site of the present Warner Co., Wilmington, Del., died recently.

WILLIAM A. HOFFMAN, 58, foreman at the Mixed Concrete & Supply Co., Wichita, Kan., died last month after a short illness.

S. T. CRAPO, vice-president and secretary of the Huron Portland Cement Co., passed away January 26.

Trade Literature

The 1939 Austin-Western Line. 24 p. Austin-Western Road Machinery Co., Aurora, Ill.

The Caterpillar R2 Tractor. 12 p. Caterpillar Tractor Co., Peoria, Ill.

Simple Facts About Synchronous Motors, 8 p. *Westinghouse Geared Drives,* 36 p. *Types SH and DH Speed Reducers,* 12 p. Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

Marmon-Herrington All-Wheel-Drive Ford V8. (Folder.) Marmon Herrington Co., Inc., Indianapolis, Ind.

More than 100,000 Industrial Foot and Toe Accidents Will Happen in 1939. 8 p. Lehigh Safety Shoe Co., Allentown, Pa.

Gearmotors. 4 p. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Class Wn-112 Air and Gas Compressors. 16 p. Sullivan Machinery Co., Michigan City, Ind.

Telsmith Machinery for Mine, Quarry, Gravel Pit. 36 p. Smith Engineering Wks., Milwaukee, Wis.

Car Pullers, Hoists and Winches. 8 p. Stephens-Adamson Mfg. Co., Aurora, Ill.

Model E-1 Portable Bulk Cement Plant. 6 p. Heltzel Steel Form & Iron Co., Warren, O.

The Caterpillar Line for 1939. 32 p. Caterpillar Tractor Co., Peoria, Ill.

Twenty-Five Years . . . 1914-1939. 32 p. Bay City Shovels, Inc., Bay City, Mich.

Last year when the truck industry as a whole showed considerable recession, the Marmon-Herrington Co., Indianapolis, Ind., manufacturers of all-wheel-drive trucks failed to followed the trend of the industry and enjoyed a business on a par with that of the profitable year of 1937.

The Marmon-Herrington Co. manufactures a complete line of all-wheel-drive trucks consisting of more than 30 extra-heavy-duty trucks and truck tractors with capacities up to 25 tons for the trucks and as much as 80 tons for the trailer tractor. In addition, the company converts all standard Ford trucks, commercial cars and passenger cars to all-wheel-drive. This conversion, which contributes almost unbelievable performance, involves important chassis changes which are done on a production basis.

Occupational Diseases and the Law

Remedies

Gardner v. Pittsburgh Clay Pot Co., decision on motions for new trial and judgment notwithstanding the verdict, Common Pleas Court of Allegheny County, Pennsylvania, April 29, 1938; reported at 87 Pittsburgh Legal Journal 30. The plaintiff contracted silicosis while employed in the defendant company's factory. His employment required him to work at a rubbing or grinding machine where clay bricks were prepared for lining glass furnaces, and the damage suit was based on failure to provide fans of sufficient power to carry off the dust thus created, as required by Section 11 of the Factory Act of May 2, 1905, P. L. 352. A verdict of $15,000 was awarded to the plaintiff.

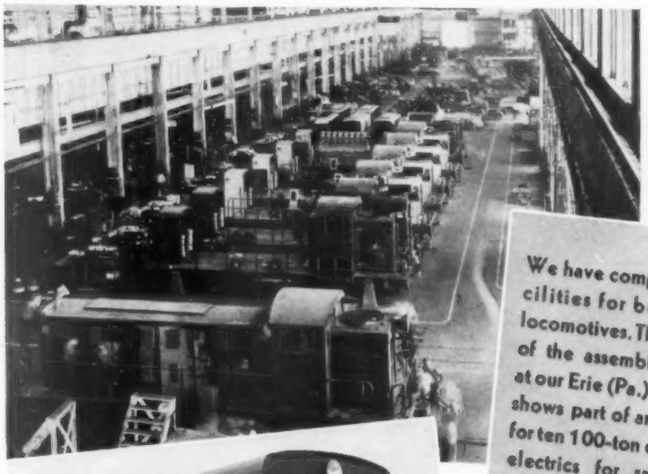
On motions for new trial and judgment notwithstanding the verdict, the defendant company conceded that the sufficiency of its fan would be a question of fact for the jury under plaintiff's common law right of action, but contended that since the Factory Act of 1905 was repealed by a Pennsylvania law enacted on May 18, 1937, P. L. 64, it was under no statutory duty to provide such fan and that the defense of assumption of risk was available to it. The court ruled, however, that since the Factory Act was in existence when the suit was instituted, the plaintiff had the right under Section 96 of a law enacted May 28, 1937, P. L. 1019, to proceed either under that law or the new law which supplanted it.

The court further upholds certain instructions given to the jury on computation of present worth of loss of earnings—which is a question of how long the plaintiff would have been able to earn a livelihood and not how long he would have lived had he not contracted the occupational disease, and was correctly stated in spite of a reference to the "lifetime" of the plaintiff—and holds that the verdict of $15,000 to a man 59 years old was not excessive since a large portion of it was awarded for pain and suffering.

Big News!

SMALL DIESEL-ELECTRIC LOCOMOTIVES

at the lowest prices in diesel-electric history!



We have complete facilities for building locomotives. This view of the assembly floor at our Erie (Pa.) Works shows part of an order for ten 100-ton diesel-electrics for railroad use

This new 20-ton diesel-electric is one of five now working in the quarries of a large cement company

SIZES as small as 10 tons. Prices approximately the same as you pay for straight mechanical locomotives.

Here's what electric drive gives you: Smooth and constant application of power; accurate control; faster pick-up, which means more work in less time; ease of control, which keeps your operators alert.

Because of much lower operating cost, diesel-electrics pay for themselves in only a year or two. A G-E representative will analyze your haulage problem and determine how much these new diesel-electrics will save you. Write for Bulletin GEA-3071, General Electric, Schenectady, N. Y.

BUILDER OF ELECTRIC LOCOMOTIVES SINCE 1887

GENERAL ELECTRIC

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The extra STRENGTH is in the *Spiral*

THE once necessary evil of using *heavier* pipe than was needed in order to obtain the required *strength*, was wiped out when Taylor Forge pioneered spiral pipe.

That spiral seam makes it possible to produce a pipe that is light walled and therefore less expensive to buy, ship, and use—yet strong in every way, thanks to the spiral reinforcement which stiffens it from end to end—holds it round and true against collapsing strains—gives it bursting strength even beyond that of a seamless tube of equal gauge.

You simply choose the gauge you need for the job, never paying a penalty for superfluous weight. Let it cut the cost of water, sand and gravel lines. Ask for the new Catalog 36.

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EXTRA HIGH CAPACITIES in Sizing Materials

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Two-deck, 3 ft. x 8 ft. Simplicity Gyrating Screen, installed at Malvern, Ark., in spring of 1938. Doing a wonderful grading job and in continuous operation.

WRITE FOR SIMPLICITY BULLETIN

SIMPLICITY SCREEN at Plant of Walter J. Ehrler Crushed Stone Company

Modern plants are simplifying their production methods with Simplicity Screens, for this efficient equipment is flexible enough to provide a full range of grading specifications with accuracy, uniformity and extra high capacity. The plant shown here is typical—with Simplicity Gyrating Screen operating in circuit with a double-roll crusher, and producing 50 tons per hour of 1 in. crushed stone ballast for railroad track work in four different states.

SIMPLICITY ENGINEERING COMPANY
DURAND, MICHIGAN

Negligence

Price v. New Castle Refractories Co., decided by the Supreme Court of Pennsylvania, January 9, 1939; reported at 3 Atl. (2d) 418. This was a suit by a widow to recover damages for the death of her husband, alleging that the husband died of silicosis contracted as a result of defendant's failure to provide him with a reasonably safe place in which to work.

Silicosis is an occupational disease, and not compensable under the Pennsylvania Workmen's Compensation Act of June 2, 1915, and this case is too early to be affected by the Pennsylvania Occupational Disease Compensation Act of July 2, 1937; hence, the question involved was whether the defendant furnished the deceased a reasonably safe place to work as measured by the requirements of the Act of May 2, 1905. Although dust-removal equipment was installed by the defendant, the jury found that the device installed was insufficient, and this finding is accepted by the Supreme Court. "An ineffective and feeble device is no more a fulfillment of the legislative demand than no device at all" (*Fritz v. Elk Tanning Co.*, 258 Pa. 180, 101 Atl. 958). The finding of the jury that the deceased died from silicosis as a result of inhalation of dust particles in his occupation, and not from pulmonary tuberculosis unconnected with his employment, as claimed by the defendant employer, is also accepted by the Court.

The defense of assumption of risk was not permissible in this case; it is ordinarily available in master-and-servant cases, but not in cases where an employee is injured through the failure of the employer to comply with the Act of 1905. Contributory negligence on the part of the employee would be a complete defense, and if the deceased had failed to use a dust mask provided his conduct would have barred recovery; however, here again the adverse finding of the jury on the point of contributory negligence is accepted by the Court.

The Anaconda Wire & Cable Co., New York, N. Y., has developed a new mining cable known as the "Sunex Securityflex" which is said to be extremely resistant to heat, moisture, exposure to the hot sun, alkalies and acids.

The new jackets are now available for a wide variety of cables in voltages from 300 to 7,000, shielded and unshielded, in single and multiple conductors of different strandings for varying degrees of flexibility.

Distributors recently appointed by Bay City Shovels, Inc., include: Henry H. Meyer, Inc., Baltimore, Md.; State Equipt. Co., Parkersburg, W. Va.; and Long-Lewis Hdwe. Co., Bessemer, Ala.

Traffic News Digest

LEGISLATION

Transportation Act.—The most important single bill relating to transportation that has been introduced into Congress is H. R. 2,531, introduced January 13 by Rep. Lea, chairman of the house committee on interstate and foreign commerce. This bill does not follow all the recommendations of the President's committee on transportation. According to Mr. Lea it is designed to preserve each type of transportation in giving the country the benefit of its economical advantages and to protect it in the performance of those functions. The bill which would be cited as the "Transportation Act of 1939," provides for enlarging the Interstate Commerce Commission to 19 members, each receiving a salary of $12,000 with terms of 7 years, with the secretary of the commission receiving $10,000 a year. That would be an increase of $2,000 for commissioners and $1,000 for the secretary.

The commission would be divided into three divisions, the appeal division of five members, the rate division of nine members and the finance division of five. The appeal division would hear and determine applications for reconsideration, reargument or rehearing from any decision, order or requirement made or issued by the rate division.

The rate division would have jurisdiction over (1) classifications, practices, rates, fares and charges for services, tariffs and divisions; (2) the establishment of through routes and joint rates; (3) the providing and rendering of services except where investments for new facilities are involved; (4) acts, records and reports; (5) valuation of properties. The finance division would have jurisdiction vested in the commission that was not vested in the rate division or in the entire commission as provided in a later paragraph giving the entire commission jurisdiction in respect to the commission's employees, offices, expenses and reports to congress.

The bill would give the commission power to approve or require pooling or division of traffic or earnings and would authorize the commission to approve consolidations, mergers, purchases, leases, operating contracts or acquisition of control on terms and conditions. It would repeal the law requiring a plan of consolidation by the commission.

The bill would prohibit the increase of water rates reduced to meet railway competition after the railway competition was eliminated unless after hearing the commission found that such proposed increase rests on changed conditions other than the elimination of railway competition.

The office of transportation administrator within the commission would be created at a salary of $7,500 a year. (At later hearings Chairman Lea said this figure was an error; it should be $12,500.) It would be the duty of the administrator to plan, encourage and promote such acts by the railway carriers as would have the effect of reducing the operations, facilities or properties or the cost thereof recognized to meet the reasonable demands of the public for adequate and efficient railway transportation and enable such carriers by cooperative effort directed to a common end to meet such demands more efficiently, effectively and economically including among other things the consolidation or unification of prop-

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Simple, Powerful Vibrating Mechanism

Only two heavy duty S.K.F. spherical roller self-aligning bearings—running in oil—ingenious internal flingers completely exclude dirt and moisture and positively prevent any loss of lubricant.

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Compression springs mounted on the clamping plate bolts maintain the proper tension on the screen cloth wires. No whipping with resultant breakage. No baggy screen panels.

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Hand-hole plates in the side of screen frame permit operator to remove any one screening surface and replace the screen section independently of other surfaces.

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Vibrating frame floats on resilient mountings which absorb all vibrations. No special reinforced substructure required.

This is only part of the story—only four of the twelve important features of the new Deister Plat-O Vibrating Screen—write for all the facts.

DEISTER MACHINE CO.

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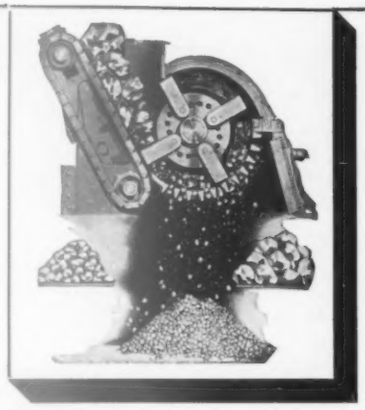

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Made in 40 sizes for all capacities, a type for every purpose. Reduces anything from mine, pit or quarry. Primary, secondary or fine reduction in one operation.

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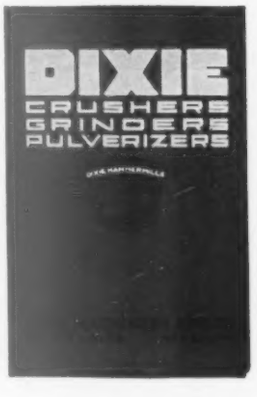

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erty arrangements for the pooling or division of earnings or traffic, the joint use of terminals, shops, and other facilities; the pooling of equipment or any increase thereof, over common ownership or control, collective or cooperative arrangements for the handling of any class of traffic, or for purchases and various accounting or fiscal matters, and the substitution of motor or water transportation for rail transportation, whether by joint arrangements with motor or water carriers or otherwise. The administrator is authorized to intervene in cases involving any of the above subjects.

The bill would authorize the R. F. C. to make loans to carriers on stated terms and conditions if the commission may in the circumstances, find it to be consistent with the public interest. Carriers would be exempted from antitrust laws, and from all other restraints or prohibitions of law, state or federal, other than relating to public health or safety; except that the railway labor act would not be affected. The carriers under this bill might retire employees who had reached the age of 65.

The administrator would be given full authority to carry on any investigations he deems necessary and would at all times have access to all accounts, records, memoranda of the carriers and to their properties and carriers shall furnish him and his assistants such information and reports as he may desire in investigating any matter within the scope of his duties under the act.

The bill further would create a Railroad Reorganization Court composed of three judges and outlines procedure for handling railroad reorganization.

Land-grant rates would be repealed by this bill which would also provide for payment by the government of its freight bills prior to audit or settlement by the general accounting office with provisions of subsequent adjustments if necessary.

Senator Wheeler, chairman of the Senate committee, said that hearings would not be held on the transportation bill in the Senate until hearings on the house bill had been concluded. He is opposed to increasing the size of the commission. Hearings on the Lea bill began January 24. After Chairman Lea discussed the bill commissioner Splawn and others spoke for and against various parts of the bill. Most violent opposition came from George M. Harrison, chairman of the Railway Labor Executive Association and also a member of President Roosevelt's committee of six. He said he violently disagreed with the provision of the bill which would shrink the railway plant by the action of a transportation administrator and the commission and that he was serving notice on congress that railway labor would oppose enactment of any legislation giving the government power to compel elimination of railway facilities. He also opposed the provision giving carriers authority to retire employes 65 years of age or over. The executive committee of the American Trucking Assn., Inc., went on record in opposition of the provisions for reorganizing the commission. A special meeting of the National Industrial Traffic League was called to consider the bill. The executive committee of the League condemned the commission reorganization provisions.

Postalization of Rates.—A joint resolution has been introduced into congress by Chairman Wheeler of the Senate interstate commerce commission as S. J. Res. 58 and in the House by Rep. Lemke as H. J. Res. 152 providing for investigation by the interstate commerce commission of the plan for postalization of railroad fares and rates The resolution requires the commission to make a report with recommendations not later than January 3, 1940, and authorizes an appropriation of $25,000 for the investigation.

Fourth-Section Revision.—Senator Reed has introduced S. 1,170 a bill proposing a revision of the fourth section which would eliminate the time for deciding fourth-section applications to 7 months.

Other Bills Filed.—In addition to the transportation bills mentioned above many other bills have been filed which would affect transportation. Among these is the following:

H. R. 2,298 to compel retirement of railroad employes at the age of 65.

H. R. 15 providing for a uniform system of motor-traffic regulations by states receiving Federal highway aid.

H. R. 2,299 would refuse Federal aid to any highway project in any state allowing a speed of more than 50 mi. per hr. for any motor vehicle with certain specified limits for various weights of trucks.

H. R. 1,939 directing the Department of the Interior to locate, survey and build three transcontinental highways and six north-south highways and a system of air ports in connection with these highways. These roads 100 ft. wide would be constructed on a right of way 500 ft. wide and would not ordinarily pass through cities or towns. An appropriation of $8,000,000,000 is contained in the bill.

H. R. 1,976 would provide for judicial review of negative orders of the commission.

H. R. 2,767 proposes to create a corporation to build superhighways for the use of which tolls would be charged.

H. R. 1,003 providing for the creation of a Federal recovery authority to construct superhighways.

S. 916 to establish a United States Court of Appeals for Administration which would have jurisdiction over orders and decisions of the interstate commerce commission and other Federal agencies.

H. R. 3,369 to amend the interstate commerce act to bring about uniformity in sectional and intersectional rates.

S. 1,085 to give the commission power to prescribe through routes without regard to the short hauling of carriers.

S. 1,132 to reduce the number of members of the commission from 11 to 5. It would prohibit the commission making investigations on its own motion except those relating to safety devices and systems; would remove the power of the commission to issue certificates of public convenience and necessity with respect to the construction of a new lime or the abandonment of a lime or to order any common carrier to construct and maintain facilities. The bill would also take away the power of the commission to prescribe rates, fares or charges and the power to suspend the operations of any new schedule or to have any jurisdiction in the matter of who might b officers or directors of any common carrier or to have any control over the routing of traffic.

RECENT I.C.C. DECISIONS

Plaster.—In response to a number of fourth-section applications the commission has modified the prior report in 218 I.C.C. 406 to grant further fourth-section relief on plaster and plaster board from trunk line and New England territories to destinations in southern territory over routes over which relief has been granted on class rates. I.C.C. F.S.O. No. 12, 510.

Sand.—Reparation of $199.01 with interest has been awarded on finding that the rate of 75c. a net ton on sand from LaGrange, Mo., to Montrose, Ia., was unreasonable to the extent that it exceeded 65c. a net ton. I.C.C. Docket No. 28,005, Cameron, Joyce & Company *v.* C. B. & Q.

The commission has found not justified the proposal of the carriers to increase the minimum rates on phosphate sand or clay which

MANGANESE STEEL CASTINGS

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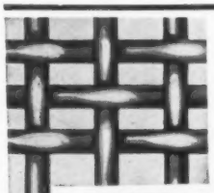
· Pulverizers ·
· Conveyors ·
· Crushers ·
· Dredges ·
· Shovels ·
· Screens ·
· Cranes
· Rolls ·

The Frog, Switch & Mfg. Co. CARLISLE, PA.



NO. 9381
TY-ROD
U. S. PATENT
NO. 2,024,806
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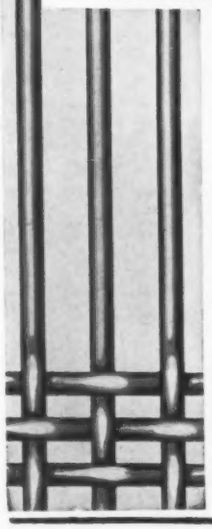
TY-ROD
HIGH CAPACITY
SCREEN



for
DAMP
STICKY and
FIBROUS
materials

TYLER
WOVEN WIRE
SCREEN CLOTH
in All Meshes
and All Metals

TYLER-NIAGARA
SCREENS

HUM-MER and
TYPE 400 SCREENS

SCRUBBING and
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THE W. S. TYLER
COMPANY
Cleveland, Ohio

is in direct competition with ground limestone, from points in Florida. The carriers proposed to increase the minimum weight to 72,000 lb. The present minimum weight is 90 per cent. of the marked capacity of the car which allows a minimum of 54,000 lb. when a 60,000-lb.-capacity car is ordered. I.C.C. I. and S. Docket No. 4,516.

Sand and Gravel.—The commission has modified previous orders covering rates on sand and gravel within Mississippi to permit a rate on sand and gravel from Amory to Fulton, Miss., of 35c. a net ton.

Foreign Developments

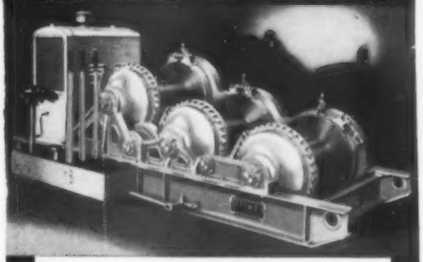
Studies on Iron-Bearing Fused Cements

The author studied the constitution of a fused cement containing notable quantities of iron, introduced either in the ferrous or the ferric state. He made use especially of the optical methods of observation by transparency and reflection; chemical and Röntgenographic analyses were indispensable for certain identifications. The author, who made preliminary researches on the system $CaO - Al_2O_3 - Fe_2O_3$, was able to determine in the fused cement seven constituents arranged as follows according to their frequency: monocalcium aluminate, gehlenite, magnetite, pentacalcium aluminate (this form is unstable), solid solution of $2CaO.Fe_2O_3$ in $4CaO.Al_2O_3.Fe_2O_3$, $2Fe_2O_3$, perowskite. There are also other less important minerals. The constituents identified differ a little, as to their properties, from the same bodies in the pure state. The mechanical properties as well as several different mineralogical varieties were studied.—B. Tavasci in *Chimica e Industria,* July, 1938; *Verre et Silicates Industriels* 9:396, Dec. 5, 1938.

Capacity Formula for Rotary Cement Kiln

A study of rotary cement kilns in Japan shows that the specific capacity of the kiln decreases gradually as the volume increases. Rotary cement kilns in Japan were found to be so efficient that the capacity formulas of Meade and others can not be applied to determine their capacities, and the discrepancy resulting from these formulas must in part be attributed to the insufficiency of the authorities or unsatisfactory data because of limited range of the investigations. In place of the earlier formulas the author proposes,

BUYING A HOIST?



JAEGER Touch Control Hoists—30 to 100 H.P. Offer You . . .

1: Giant Expanding Frictions, as on $15,000 Shovels, giving easy finger-tip control of loads.
2: Self-Aligning Anti-Friction Bearings standard equipment.
3: Accurately Balanced Drums.
4: Rigid Construction, Multi-Cylinder Power, Silent Chain Drive. 1 to 3 Drums (interchangeable). Gas or Electric.

Standardized construction (only 3 basic types for 30—100 H. P.) means big savings, lower prices. Get new Catalog.

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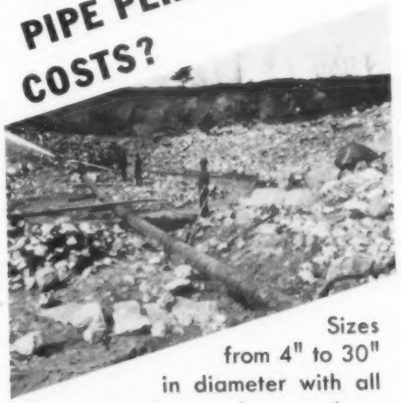
NAYLOR LOCKSEAM SPIRALWELD PIPE

WHO ELSE WANTS TO CUT PIPE PERFORMANCE COSTS?



Sizes from 4" to 30" in diameter with all types of fittings and connections. Complete fabrication service. Quotations on your requirements furnished promptly.

WRITE FOR CATALOG No. 37

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1257 EAST 92nd STREET
CHICAGO, ILLINOIS

for dry-process kilns, a new empirical formula which holds good in theory and practice:

$$C^1 = k \times 0.04552Ve^{(-0.00045v)}$$

(K.T. per hr.)

Although this formula was derived for the dry-process kiln, the principle implied is applicable also to the wet-process kiln. An investigation of five wet-process kilns showed that the specific capacity of the wet-process kiln was about 75 per cent. of that of the dry-process kilns.

The kilns of large volume are not always uneconomical in spite of their smaller specific capacity, for as a rule they are economical in initial cost and operating expenses. It is advised that the rotary cement kiln be built with due consideration both to economic and to technical factors.—T. Yoshii in *Kogyo Kwagaku Zassi, Journal of the Society of Chemical Industry, Japan,* 41:330B1334B, October, 1938.

Shrinkage and Loss of Water in Cement

In the evaluation of shrinkage tests of cement specimens attention has to be given to the loss of water from the specimens, which can best be taken into account through the relation of shrinkage through loss of water (s/w). The length of the wet storage affects the shrinkage, the loss of water and the value s/w. With longer wet storage the shrinkage and the loss of water decrease, but the value of s/w increases for the first 21 days of cupboard storage. One exception was noted in the case of the shrinkage, however.

Over sulphuric acid corresponding to 70 per cent. relative atmospheric humidity the drying out and the shrinkage proceed more uniformly, with lower values, than over sulphuric acid corresponding to 50 per cent. relative atmospheric humidity.

The representation of the values for s/w for the period from 7 to 28 days in relation to the fineness of grinding, expressed in percentage of residue on the 4,900-mesh (sq.cm.) sieve for each individual variety of cement gives a determined specific relation. This manner of representation differentiates the cements better and yields conclusions as to the reactive capacity during the preceding 7 days' moist storage.

Tests with changing the proportion of the gaging water in mortars with a Portland and an iron-Portland cement led essentially only to a corresponding alteration in the loss of water in the process of drying out.—H. E. Schwiete and H. Berchem in *Zement* 27:655-660, Oct. 20, 1938.

8 NEW MEMBERS OF THE "NATIONAL" HIGH-X-PLOSIVE FAMILY

POWDER NATIONAL COMPANY

NATIONAL presents six new special

AMMONIA DYNAMITES

worthy additions to a powerful family of quality explosives.

These are high stick count powders with strengths from 17% to 48% inclusive. They are recent developments of NATIONAL Technical Service.

Two more high stick count powders of the Semi-Gelatin type are now offered. Write for information.

Permissibles, Nitroglycerin, Gelatin, Ammonia Dynamites, Flo-Free Dynamites, and all Blasting Supplies.

TECHNICAL SERVICE at your request.

NATIONAL POWDER CO.

Executive Offices: DUKE CENTER, PA. Plant and Sales Offices: ELDRED, PA.

PERFORATED METAL SCREENS

FOR SAND, GRAVEL STONE, ETC.

Manufactured exactly to your specifications.

Any size or style screen, in thickness of steel wanted with any size perforation desired.

We can promptly duplicate your present screens at lowest prices.

Prompt Shipment

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2435 W. 24TH PLACE CHICAGO, ILL.

Telephone CANAL 1459

New Machinery and Supplies

• Motor Trucks

The Hug Co., Highland, Ill., manufacturer of Hug Roadbuilder trucks, announces the addition of three heavy-duty chain-drive models designated as Models 98-CD, 98-MB and 99-MA.

The 98-CD is a single-rear-axle model with a maximum gross vehicle weight of 60,000 lb., and comes equipped as standard equipment with a 10-12 cu. yd. Boulder Dam type body. The 98-MB is a dual chain-drive rear-axle model with a gross vehicle weight of 72,000 lb., and the standard body equipment consists of a 16-cu. yd. Boulder Dam type body. The 99-MA also is a dual rear-axle chain-drive model, has a maximum gross vehicle weight of 120,000 lb., and comes equipped with a 25-cu. yd. Boulder Dam type body.

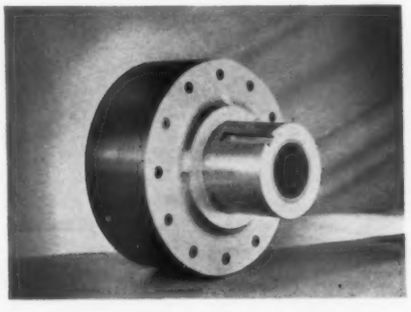
These models utilize the Maxi chain-drive units built by Six Wheels, Inc., Los Angeles, Cal. All are built and designed for extra heavy-duty service and incorporate special features of design such as an all-welded I-beam frame, rocker-action front axle, set-back wheel design and heavy-duty armored cowl, hood and radiator guard. Air-brake equipment on all wheels is standard, bucket-type seat is standard while a closed steel cab is optional at extra cost.

• Clutch

The Hilliard "over-running" clutch, manufactured by the Hilliard Corp., Elmira, N. Y., consists of a forged-steel housing rigidly connected to a sleeve which can be joined to either the driving or driven mechanism. An accurately ground race of oil-hardened tool steel conforms to the inside of the housing.

The hub or central part of the clutch is provided with many flat surfaces ground on its hardened tool steel circumference. The hub can be connected with either the driving or driven shaft. Thus the housing forms one of the two primary members of the clutch, the hub forming the other.

The internal mechanism which serves to connect or disconnect the drive between the housing and the hub consists of a series of



The "over-running" clutch.

hardened and ground tool steel rolls held in position on the flat surfaces of the hub, forming a perfect circle and running between the hub and the race in the housing. The rolls are in light contact with both members.

The spaces between the flat surfaces on the hub and the curved surface of the outer race are substantially in the form of acute angles with each roll touching both sides of an angle.

When rotation of the housing with respect to the hub is in the driving direction, this rotation tends to wedge the rolls tightly in the angular spaces and the drive is positively transmitted without backlash and without slipping.

As the speed of rotation of the driven member increases, or the driving member decreases, the rolls come out of their wedged positions so they are only in light contact. This allows the clutch to coast, or "over-run," until the load is again automatically taken up.

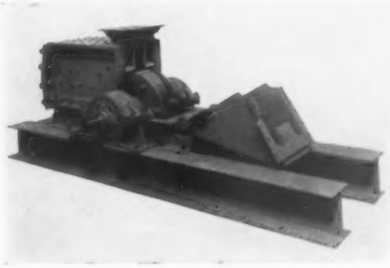
The entire design is based on principles recognized for many years as best for free-wheeling action.

• Impact Crusher

A new type of impact crusher has just been announced by the Nordberg Mfg. Co. This new development, like the Symons cone made by the same company, is also used for secondary crushing. While the exterior appearance of this crusher is somewhat similar to that of other rotary crushers operating on the impact principle, the crushing action is said to be entirely different.

The feed enters the crusher through a long vertical chute at a speed so timed in relation to the impeller speed that the pocket at each impact plate is filled to its full depth as it passes under the chute. This means that the full area of the impact plate is available for crushing and, since the incoming material is struck at right angles, there is little tendency to slip and cause wear to the crushing members. With the first crushing taking place at the impact plate, the material is then projected forward horizontally against the stop plates where further reduction in size occurs. The material coming onto the stop plates does not have time to fall away before another discharge from the impeller reaches this point, consequently there is always a protective bed of material preventing wear to the stop plates. Material striking material further aids in the crushing process.

Of the various features of the Symons impact crusher, two stand out because of their importance to users of crushers of the rotary type. One is the making of a more cubical product so much in demand today and which brings a premium price in any market. When material strikes material at the stop plate, the sharp corners and points of the stone are eliminated resulting in a product more cubical in shape. Another factor affecting the shape of the product is the even wear of the crushing members. The size and shape of the product does not change with wear.



Impact crusher for secondary reduction.

The second feature of this crusher is reduction in maintenance and service expense, which has always been one of the objections to crushers of the rotary type when crushing hard, abrasive materials. With the incoming feed always given a right-angle blow and no tendency toward slippage, abrasion and resultant wear are reduced to a minimum. When the material is projected from the impeller, it does not rebound again in the path of the impeller to be struck a second time by the impact plates, nor is it dragged over a grating or grid to cause rounded wear to the impact plates. The crushing members are worn away evenly, there being little waste at time of renewal. The ease afforded for replacing the crushing members also aids in reducing maintenance expense. A change of impact plates can be made in half an hour.

The Symons impact crusher is built in four sizes having a capacity range from 25 to 225 tons per hour.

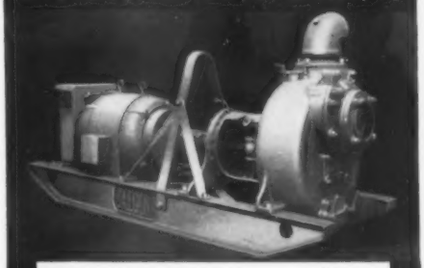
• Classifier

Important improvements in classification have been incorporated in the new Hardinge Hydro-Classifier, announced by Hardinge Co., Inc., York, Pa.

The new design provides two outstanding advantages: improved performance and low operating cost. The first is achieved by design. The driving head embodies a geared head motor and the cast iron housing upon which it is mounted. A cut-tooth gear rotates on ball bearings in oil within the housing. The use of a spur-gear drive adds to the strength of the mechanism, and permits forcing the scraper through the heavy solids, which are liable to pack, in the bottom of the tank.

Sand, or oversize, in the classifier is deliv-

BUYING A PUMP?



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Combine 100% automatic priming with the huge water volume and low power requirement of high efficiency centrifugals. Meet any demand for gravel washing up to 220,000 G. P. H.

Compact, simple, noted for long-life operation. All sizes to 10", gas or electric, on wheels or base. Get catalog, prices and performance data.

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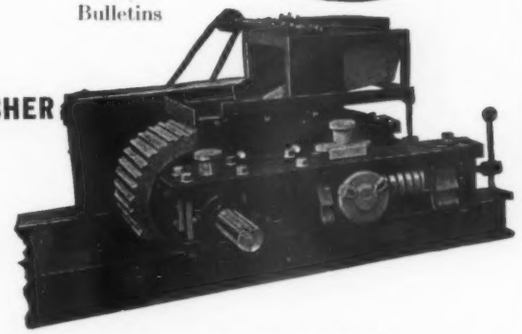
NEW HOLLAND

New Holland VIBRATING SCREEN
6 sizes, 1 to 3 decks

CIRCLE-THROW gives extra capacity by intensifying the oscillating action on every square inch of screening surface — prevents any blinding and insures more uniform sizing.

Ask for Bulletins

New Holland ROLL CRUSHER



equipped with new type *pulsating feeder* that keeps crusher operating at maximum rate for any size feed and, in many cases, actually doubling the capacity.

NEW HOLLAND MACHINE COMPANY
NEW HOLLAND PENNSYLVANIA

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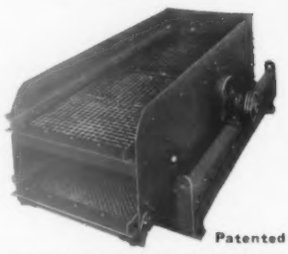
TO
GREATER PROFITS
WITH
SECO
VIBRATING SCREENS



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JOIN THE ARMY
OF ENTHUSIASTIC OWNERS WHO ARE PRODUCING MATERIAL FASTER WITH MORE ACCURATE SIZING AND LOWER MAINTENANCE COST THAN EVER BEFORE.

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BACON
FARREL
CRUSHERS

Complete Plants Designed and Equipped. Screens, Elevators, Conveyors, Quarry, Sand and Gravel Plant Equipment. Engineering Service.

EARLE C. BACON, Inc.
17 John Street New York, N. Y.

cred through a central opening, in the bottom of the tank, which is surrounded by a whirling vortex of water which assures proper desliming of settled solids, and a clean oversize.

A multi-speed motor is used in order that the scraping may be varied in speed to meet existing requirements, and to provide repulping in case it is desired.

This classifier is designed for metallurgical, chemical and industrial purposes and is made of standard steel, or acid-proof construction such as: special metals, rubber covered metal, or wood, where parts are exposed to corrosive action of the liquid in the pulp, as may be needed to assure best performance in individual operations. The entire unit is compact and accomplishes its purpose, most effectively. For example, where fine separations are demanded, the new classifier will deliver them at a new low level of capital cost.

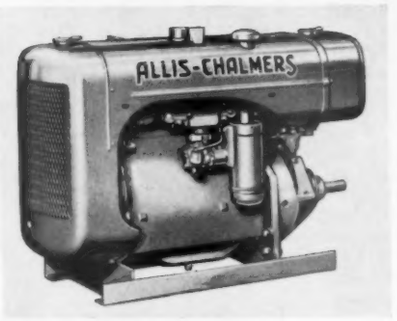
The improved hydro-classifier.

• Gasoline Engine

The Allis-Chalmers Mfg. Co., Milwaukee, Wis., has announced the addition of a new Model B-15 to its line of gasoline power units.

This new unit consists of the engine, which is being used in the company's Model B tractor, mounted on a substantial welded-angle-iron base and complete with radiator, hood, removable louvered side plates, fuel tank, clutch, clutch housing and pulley shaft. The B-15 is a 4-cycle, 4-cyl. gasoline engine with a bore of 3¼ in., stroke of 3½ in. and 116 cu. in. displacement. It has removable cylinder liners, high-tension magneto ignition, a heavy-duty, oil-bath air cleaner, oil and fuel filters and other modern features designed to assure long life and economical operation.

The B-15 develops a maximum of 19 brake horsepower at its normal governed speed of 1400 r.p.m. At 1800 r.p.m. it develops 22 brake horsepower maximum. Its maximum torque is 74 lb. ft. developed at 1100 r.p.m. This new unit measures only 31 1/16 in. high, 17⅞ in. wide and the length including starting crank is 52¾ in.



New gasoline power unit.

The B-15 will furnish economical power for gravel-washing and screening plants, asphalt plants, portable concrete mixers, pumps and other industrial equipment requiring 15 to 18 continuous horsepower.

• Scraper

Continuing to pioneer the movement towards larger pusher-loaded scrapers and lower construction costs, R. G. LeTourneau, Inc., of Peoria, Ill., has recently introduced its Model W. Carryall Scraper rated at 23 cu.yd., heaped measure.

A number of features are embodied in this large Carryall that make it an ideal extra-capacity unit: large, single bucket; special alternate curved and straight cutting blades placed at a plow-like, natural suction, digging angle for boiling loads in easier; positive. "wipe-out" ejection tailgate that quickly cleans the bowl of the most stubborn materials; and a new large sheave arrangement that reduces cable strain, facilitates load handling, and keeps the dirt out of the sheaves and the cable.

The huge bowl measures 10 ft. deep, 10 ft. wide and 5 ft. high. The extra high sides retain the spill usually wasted over the edge in loading and turn it into additional pay yards for the contractor. Eight 18-in. by 24-in. special pneumatic tires lighten the draft and give ideal flotation over soft ground and adverse hauling conditions.

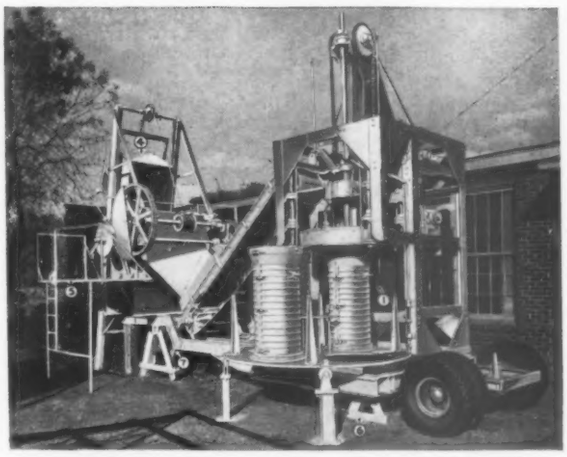
Dempster Brothers, Inc., Knoxville, Tenn., have recently assigned for the distribution of their Dempster-Dumpster, territory including Delaware, Maryland, the District of Columbia, and Virginia to the firm Cornell & Mathews of Wilmington, Del.

New power scraper of 23-cu.yd. capacity.

PIT AND QUARRY Special Section

PROFITABLE NEW PRODUCTS

MAKE McCRACKEN PIPE Corrugated and BE A PIPE-CONTRACT WINNER



Portable Model T can be leased for operation anywhere in U. S. A. Triples territory of your permanent plant—PROFITABLY.

4 WAYS TO SAVE MUNICIPALITIES ON THEIR SEWER LINE CONSTRUCTION

- New Portable Dual Packer-Head pipe machine can be moved to contract site—Saves Transportation Cost on pipe and, by making possible the use of local labor and materials, enables the municipality to keep 80% of their contract money at home.
- Produces highest quality pipe under expert pipe manufacturer's personal supervision—Saves Time by producing more pipe per minute than any other method.
- New Roller Head permits use of more coarse aggregate—Saves 10 to 15% on cement.
- New Sealtite Joint and Alignment Perfector assure greatest speed and accuracy in laying the pipe—Save on construction cost and practically eliminates maintenance costs.

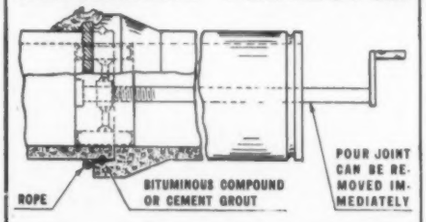
Reasons Why Most Engineers Prefer McCracken

McCracken pipe are machine-made, assuring greatest accuracy in shape and dimensions. Pipe can be made on location, in 4- to 36-inch sizes, and laid with New Alignment Perfector, assure smooth internal flow. McCracken pipe permit two lines of reinforcing or one elliptical line and more than withstand all standard tests. Give greater hydraulic capacity and remove need for oversize pipe.

The New Sealtite joint prevents infiltration and overburdening of disposal plant in wet weather, thus eliminating most maintenance chores and removing danger of cesspool contamination of the ditch line.

Write for particulars. Learn about the vast, new, profitable concrete pipe field.

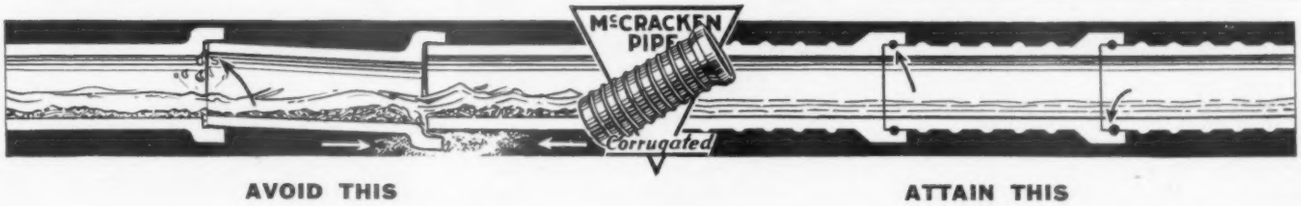
ALIGNMENT PERFECTOR



THE ALIGNMENT PERFECTOR IS THE SEWER CONTRACTOR'S ABLEST ASSISTANT AND THE CITY ENGINEER'S KEENEST INSPECTOR

CONCRETE PIPE MACHINERY CO.

Sioux City **Dept. P-2** **Iowa, U. S. A.**



AVOID THIS ATTAIN THIS

Sales-Promotion Programs Revealed as Concrete Builders and Products Manufacturers Convene in Chicago

NEARLY 2,500 persons connected with some branch of the concrete industries — contractors, products men, technicians and ready-mixed operators—registered for the annual conventions of these groups held February 6 to 9 at Chicago, Ill.

Included in the organizations which held their annual gatherings were the National Concrete Masonry Assn., the American Concrete Contractors' Assn., and the Cast Stone Institute, while participating in the joint session on Wednesday, February 8, and the annual banquet on Thursday evening were members of the Illinois Builders' League, which held its twenty-first annual convention concurrently with that of the concrete men.

The magnet of attraction during the week was the Concrete Industries Exposition, where about fifty equipment makers exhibited their wares in attractive booths and in the heavy-machinery hall. Because of new developments, particularly in the field of vibration in the manufacture of concrete units, more than usual interest was displayed in the machines and methods shown.

Chosen to direct the affairs of the National Concrete Masonry Assn. for the year 1939 was young, likeable Harve E. Kilmer (Iowa Concrete Crib & Silo Co., Des Moines, Ia.) The vice-presidents elected were R. N. McCandless (Cinder Block, Inc., Detroit, Mich.), Walter J. Manhardt (Best Block Co., Milwaukee, Wis.), and John L. Strandberg (Concrete Building Units Co., Kansas City, Mo.). Roy L. Peck (Western Brick Co., Chicago, Ill.) was named secretary-treasurer, while E. W. Dienhart (Portland Cement Assn., Chicago, Ill.) was reëlected assistant secretary-treasurer.

The Cast Stone Institute, which met Monday and Tuesday and highlighted its meeting with an inspection trip by motor bus to the Bahai Temple, notable cast-stone structure on the Lake Michigan shore north of Chicago, and to the Portland Cement Assn. development laboratory at Elmhurst, Ill., chose M. A. Arnold (Arnold Stone Co., Greensboro, N. C.) president and A. R. Krehbiel (Krehbiel Stone Co., Kansas City, Mo.), vice-president. P. Formigli (Formigli Corp., Philadelphia, Pa.) was elected secretary-treasurer, while C. G. Walker (Portland Cement Assn., Chicago, Ill.) will continue to serve as assistant secretary.

The opening session of the National Concrete Masonary Assn. on Tuesday morning, at which President George H. Krier presided, was devoted to a number of talks on concrete-house promotion. All the speakers seemed to agree upon these points:

1. Intensive advertising and promotion are prime requisites in making a community "concrete-house conscious."
2. A basic design should be adopted, with additions or elaborations of the design left to the choice of the individual buyer.
3. The basic price should be in the neighborhood of $4,000.
4. Demonstration houses sell others.

The first speaker, B. D. Keatts, Portland Cement Assn. housing engineer, told of his experience in helping put over a concrete-house program in Milwaukee, Wis. While other types of building construction, excepting frame, showed declines in 1938, Mr. Keats revealed that concrete houses gained over preceding years. Helpful coöperation between the various products makers in the Milwaukee area, plus advertising and the erection of demonstration houses were responsible for the results attained.

Charles Akers of the Nashville Breeko Block Co., Nashville, Tenn., told

Left to Right: W. E. Dunn, W. E. Dunn Mfg. Co.; W. W. Whitney, Riverside Dunbrik Co., Thiensville, Wis.; C. L. Carlsen, Chicago Dunbrik Co.; H. L. Wadell, New London Sand & Gravel Co., New London, Minn.; J. A. Ullery, Peru, Ind.; F. E. Milewski, Dunn Mfg. Co.

Ward Beecher, Commercial Shearing & Stamping Co.; H. T. Becker and T. W. Becker, Cemstone Products Co., St. Paul, Minn.

of his company's advertising campaign to popularize the concrete house in Tennessee. This concern manufacturers cinder blocks under the trade-name "Breeko." For years the bulk of the company's business was in the field of partition walls, as back-up, and for floor fillers. Early last year the company decided to go after the housing business and built its promotional campaign about a *de luxe* booklet pointing out the various advantages and economies of concrete-unit construction. Mr. Akers attributes the success of the booklet, which was widely distributed, to the fact that its appeal was addressed to women and the usual technical data

B. F. Devine and Wood Sanford, Chain Belt Co.; T. C. Morris, D. P. Wigley Co., Racine, Wis.

were left out. As a result, a number of concrete houses were erected in the Nashville area and the company looks forward to an even better year in this respect in 1939.

How the Badger Concrete Products Co., Oshkosh, Wis., successfully overcame the resistance of buyers to early concrete-block houses of the rock-faced type and the established tendency of building frame structures in a community of skilled woodworkers was interestingly told by Ed Olsen of the Badger concern. Standardizing on Haydite aggregate for the manufacture of its light-weight units, this company first attempted to sell the public on building concrete houses through advertising alone. Failing in this, it turned to a demonstration house of attractive design. Employing an advertising expert, it ran a series of coöperative advertisements at frequent intervals while the house was being built, each piece of copy stressing one of the important advantages of concrete, such as its ability to resist vermin, the fact that such a house because of its insulating qualities is cool in summer and warm in winter, that concrete houses are solid and non-warping, and that the concrete house is an all-weather house.

On the day the house was opened to the public 1,300 persons went through

L. A. Dokey and J. Szymanski, Dowagiac Gravel & Supply Co., Dowagiac, Mich.; Jerry Topper and E. J. Heimer, Barrett-Cravens Co.

it—a remarkable result when Oshkosh's population of but 40,000 is considered. From the interest shown, according to Mr. Olsen, the company has built a number of fine-appearing houses, and hopes, through the extension of its merchandising program, to dominate the house-building market in Oshkosh in the future.

When the building slump hit Philadelphia and the demand for concrete units for the construction of party walls in row houses, Philadelphia's traditional type of architecture, was almost at a standstill, the Penn Building Block Co. cast about for a new use for its output, according to Harry Longenecker, another of the speakers. Aware of the growing popularity of the small concrete house in other localities, Mr. Longenecker's company about a year ago employed an architect, built a demonstration house in a suburb outside the city, and was amazed at the interest which followed. As a result of using but a 1-in. classified advertisement in each of Philadelphia's Sunday papers, 2,500 persons visited the house on the day it was opened to the public. Since existing building regulations did not allow the construction of houses of this type within the confines of Philadelphia proper, the company was forced to direct its activities to the subdivisions skirting the city. The first house was sold before it could be completed, Mr. Longenecker reported, and the company has built and sold 62 additional houses, while 20 more are now under construction. One building company, which became interested in concrete houses when it saw the results of the Penn company's efforts, has announced that it will erect 165 concrete houses near Philadelphia this spring. And, due to public acceptance of this type of construction and Mr. Longnecker's efforts, the city of Philadelphia has just amended its building code to allow the use of 8-in. concrete block walls within the city, thus opening a larger market for these units in the future.

N. T. Maxon, an architect with the Waylite Co., Chicago, which controls the manufacturing rights on light-weight-slag aggregates marketed as Waylite and Superock, told of his company's idea to provide concrete-house plans for its customers to expand the market for these units. H. B. Davidson, representing the magazine *Better Homes and Gardens,* told the audience of the enthusiastic response of its readers to a recently-published plan and description of a concrete house. "More than 11,230 orders have been received for our materials estimate on this house to date," declared Mr. Davidson, "breaking all records for a house of any type described in *Better Homes and Gardens.*"

Wednesday was devoted to joint sessions of the National Concrete Masonry Assn. and the American Concrete Contractors' Assn. W. G. Kaiser, manager, Cement Products Bureau, Portland Cement Assn., was chairman of the morning meeting. Walter A. Sherman, secretary, Milwaukee Concrete Products Assn., and secretary and treasurer, National Concrete Masonry Assn., presented a paper entitled *Concrete Tile and Joist Floors Prove Economical in Milwaukee Area.*

Mr. Sherman first paid a tribute to those engineers who built the first skyscrapers with nothing but their own experience to draw on when writing specifications. That they did not abuse this privilege, he said, is evident from the condition of these buildings to-day. In contrast to this freedom of individ-

Left to Right: Wm. Goetzinger and F. Erdmann, Erdmann & Goetzinger, Milwaukee, Wis.; O. V. Hicks, Building Industries, Minneapolis, Minn.; G. V. Fearn, J. B. Foote Fdry. Co.; H. W. Lackey, Blue Island Bldg. Matl. Co., Blue Island, Ill.; Jack Fearn and Clifford Ruggles, J. B. Foote Fdry. Co.

ual action is the building code of today, which, according to the speaker, in many ways stifles the building industries. The code is a legal document, unchanged in many cases for periods of 10 to 15 years because changes require legislation, while the development of materials and engineering marches by in its advance.

"Since no one individual can hope to make his outcries heard against this condition, it becomes necessary for us as a professional group to see that regulatory ordinances contain that which is modern. If the enforcing officers of such a building code are of the engineering profession then the use of the code will be intelligent, but it must be remembered that because it is a law there can be no leeway except that promised by the letter of the law. It is impossible for any one organization to write a code for general application throughout the country. Hence it is the duty of local groups to see that this is done to comply with local conditions, and that a committee should from time to time review the situation and make such changes as can be generally approved by the practicing engineers and builders as a group. These may then be incorporated in a revised specification suitable for adoption by code authorities. No specification can or should ever be finished. Time will indicate changes. This holds true for concrete construction as well as for the many other materials that go into our modern buildings.

"The designer of the structural parts of a building should be aware of two important influences in the writing of his specifications for materials; the degree of finish which he can attain in analysis, and the accuracy with which the completed structure will match his assumptions. In this day of fine teaching of the mathematics of analysis the young engineer is likely to carry out his design to a numerical precision not warranted by either his assumption, or the ability of commercial construction to build.

"The choice of a type of concrete floor for any specific use involves the careful consideration of points characteristic of each system. Intelligent comparisons may then be made and selection of a suitable, economical floor becomes a relatively simple matter. The elimination of types not inherently adapted to the proposed use reduces the number for which comparative cost studies should be made."

Mr. Sherman then outlined the various points to be considered in designing such a floor.

"The availability and economy of materials used in ribbed-slab floors with concrete-block fillers make this form of construction ideal for floors of many uses. With the proper finish these floors are easily kept clean, and wear is negligible. Their long, useful life with minimum maintenance cost produces an ideal economic combination.

"Hollow filler blocks of light-weight concrete . . . when laid in rows in the bottom of concrete slabs constitute a form of ribbed slab. The dead load is considerably reduced as compared with a solid slab of equal load-carrying capacity. The width of the concrete joists, separating the rows of filler and encasing the reinforcement, may be made any desired width to meet the strength requirements. It is customary to include a solid concrete top, 2 in. or more in depth, over the blocks. This serves a double purpose of providing a space for concealing small pipes and conduits and together with the joists gives a T-section, thereby adding considerable strength to them. Light-weight concrete filler blocks improve the sound and heat insulation of the slab. Plaster may be applied directly to the under side of the slab, without danger of discoloration, which takes place when clay-tile filler is used.

"Concrete filler blocks are produced in standard lengths of 16, 18 and 24 in. as the case may be by the producers serving various districts. The use of fillers of these lengths, as compared to the 12-in. lengths of clay-tile fillers, produces economies apparent to everyone. Light-weight concrete filler units weigh considerably less than the respective sizes of clay units. The weights of Haydite floor fillers as produced by the Best Block Co., Milwaukee, under the supervision of Walter J. Manhardt, . . . are as follows: 3-in. filler, 18 in. long, 12½ lb.; 4-in., 15½ lb.; 6-in., 20 lb.; 8-in. by 16-in., 18 lb.; 10-in., 25 lb.; 12-in., 27 lb. The extreme uniformity and square edges of these fillers insure perfect workmanship without any special precautions, which also is an economy apparent to everyone. The skeleton forming that is required reduces labor and form costs to the minimum. When a comparative cost study is made of all these facts, without even considering the many additional favorable features inherent in the use of concrete fillers, the great economy attained through their use can readily be ascertained, when compared to any other equivalent type of construction. A completed slab—as for a school, office or hotel in Milwaukee—costs approximately 5c. per sq. ft. less than a like finished slab with metal pans, which has always been considered an economical type.

"Ribbed slabs of this type are well adapted to floors with light and intermediate loadings. They can not carry heavy concentrated loads as well as the solid slabs. Design tables for use of standard light-weight concrete fillers are not generally available, as is the case of clay-tile fillers. It has become necessary for the various block manufacturers to compile their own tables for their own trade. I, myself, am completing such a table that complies with the Milwaukee and Wisconsin

codes. Widespread adoption of our system of fillers will not come unless these tables are available in every engineering handbook. This is a job for the National Concrete Masonry Assn."

Slides and tables were shown to illustrate the points covered by Mr. Sherman. Mr. Kaiser also stressed the tremendous possibilities this type of floor construction offers the concrete-products manufacturer.

The Breeko Tile and Joist Floor—Typical Installations in the South, East and Central Sections of the United States, was the subject of a discussion by Charles Akers, Nashville Breeko Block & Tile Co., Nashville, Tenn. Mr. Akers commented on what coöperation has done to increase the market for concrete products and urged competitive producers to work together in developing new markets rather than to raise prices so someone else can come in and get the business. Products salesmen, he said, have voluminous information on which to draw and all they need is sales ability. No product will sell itself as it is an engineering service, not a commodity.

His company, according to Mr. Akers, went into business in 1923, manufacturing partition tile. Later back-up tile was added. A cinder block for floor construction was next developed and patented. Licenses to manufacture this product have been restricted to plants capable of turning out a good product.

According to Mr. Akers, 9 of 11 new schools built by the P.W.A. in Nashville have Breeko floors at the request of the school board. These officials were sold by what might be called an act of providence. A tornado unroofed a gymnasium which had a Breeko floor. An ensuing heavy rain warped the wooden floor but the Breeko subfloor was undamaged.

Advantages of this type of floor construction include sound-proofness, he said, and ceilings can be left exposed and painted over if desired. The cost of this type of floor, he says, is about the same as that of the pan type of monolithic concrete floor.

The contractor's viewpoint was expressed by Harold B. Hemb, Gorey & Hemb, contractors, Evanston, Ill.. who discussed *Precast Concrete Joist Floors with Job-Placed Slabs as We Build Them in the Chicago Area.* According to Mr. Hemb, the public has taken readily to this type of floor and the only deterrent to its widespread use is that the Chicago building code requires the use of heavy aggregates. Light-weight aggregates, he said, will eventually be permitted. In order to secure the coöperation of contractors he recommended making building units which can be easily and quickly installed.

The usual practice, said Mr. Hemb, is to pour each floor before going higher with the walls as it would otherwise be necessary to shore up all the floors. Precast joists are delivered on the job numbered for location and on big jobs for floors as well. Setting the joists is at present a labor job and any necessary skimming is done to insure a good bearing on the walls. He also described the methods used in setting them on or into steel beams.

The best way of forming joists, in Mr. Hemb's opinion, is to use a saddle-shaped wire hanger to support the spreaders. Wedged-in spreaders, he said, have given trouble and caused extra work due to swelling when they became wet. He advised allowing about 1/16 in. for such expansion. The laying of wood floors on these concrete blocks is a problem, as nails can not be used. He recommends laying wooden strips on top of the conduits so that nails can be used. His company uses a rich, dry mixture of concrete and the forms are wetted before pouring.

J. W. Warren, Southern Cast Stone Co., Knoxville, Tenn., next spoke on *Precast Concrete Joist and Precast Concrete Slab Floors as We Build Them in Knoxville.* This company, a pioneer in the manufacture of precast concrete slabs and joists, built the widely-publicized T.V.A. houses at Norris Dam. About 100 houses were built, in 20 of which cinder concrete was used; regular finished concrete slabs were used in the others.

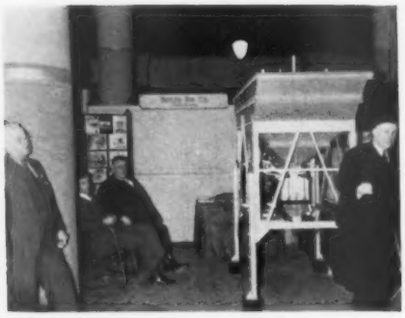
To illustrate the use of this type of construction in the Knoxville area a colored motion picture was displayed. It showed many houses and illustrated the method of making and installing these products. Of special interest was the artistic way in which interiors of many houses were finished. One new house had a flat roof designed to hold a 3-in. depth of water. This water, according to Mr. Warren, reflects and absorbs the heat of the sun's rays and in hot weather keeps the inside temperature 10 deg. below the outside temperature.

Another pioneer in this type of concrete product, C. Everett Burbank, Bedford Hills Concrete Products Co., Bedford Hills, N. Y., described *Precast Concrete Joist Floors with Precast Concrete Filler Units. Record of "Floroform" Floors in New York and Connecticut.* His company, said Mr. Burbank, uses natural sand, cinders and high-early-strength cement. Strengths of 3,000 lb. in 48 hr. and 4,000 lb. in 7 days are obtained. The joists are made in 6, 8, and 10-in. sizes in lengths up to 19 ft. and a 12-in. joist up to 24 ft. long is contemplated.

A single mold is used for each size of joist on a slow-speed vibrating table. The joists are removed immediately from the paper-lined forms on pallets. According to Mr. Burbank forty 8-in. joists can be made in an 8-hr. day. Filler blocks, he said, are made of 800-lb. concrete by hand tamping. The blocks are tapered to give a wider opening at the top which facilitates grouting. In some cases ready-mixed concrete is used for flooring. The company used a detail drawing with numbered locations for the joists.

H. W. Butler, Butler Bin Co.; J. J. Staley, Staley & Co.; W. L. Monroe; Kenneth Kerr, Butler Bin Co.

CONCRETE INDUSTRIES EXHIBITS



Reading Down: Clark Tructractor Co.; Concrete Transport Mixer Co.; Besser Mfg. Co.; Barrett-Cravens Co.; Blaw-Knox Co.

Reading Down: W. E. Dunn Mfg. Co.; Haydite Co.; Koehring Co.; Commercial Shearing & Stamping Co.; Pit and Quarry.

Reading Down: Clipper Mfg. Co.; Dow Chemical Co.; Kent Machine Co.; Colorcrete Industries, Inc.; Butler Bin Co.

CONCRETE INDUSTRIES EXHIBITS

Reading Down: Medusa Products Co.; Roeth Vibrator Co.; Lancaster Iron Wks.; Jaeger Machine Co.; J. B. Foote Fdry Co.

Reading Down: Waylite Co.; Stearns Mfg. Co.; Superock Co.; Skilsaw, Inc.; Multiplex Concrete Machinery Co.

Reading Down: Wall-Colmonoy Corp.; Solvay Sales Co.; Chain Belt Co.; Pottsco Co.; T. L. Smith Co.

Mr. Burbank said that his company in 1932 began to experiment with floor systems which eliminate the use of forms and a year later adopted the present system which, with its method of manufacture, is patented. To illustrate the growth of the demand for this type of floor he said that three jobs were supplied in 1933, 14 in 1934, 50 in 1935, 59 in 1936, 82 in 1937 and 101 in 1938. The 1938 business called for 34,600 ft. of joists and 26,000 sq. ft. of filler blocks. About 70 per cent. of this business was residence floors, the remainder being divided between porches, roofs, libraries, barns, greenhouses, etc. A job with 32,000 sq. ft. of floors is now being completed, said Mr. Burbank.

In promoting this product architects were first sold on its merits. The company also provides complete engineering service, makes estimates for contractors, makes complete engineering drawings, secures permits and does everything possible to encourage the use of its products.

The Wednesday afternoon meeting was presided over by W. D. M. Allan, director of promotion, Portland Cement Assn. The first speaker, F. T. (Tip) Brown, Missouri State Chamber of Commerce, Kansas City, Mo., gave his well-known and interesting talk on *Lifting the Face of Main Street*. He opened by stating that building has not yet returned to normal and what is needed is selling the building industry to the public. Those interested in building, he pointed out, often overlook the opportunities in their own towns where there is great need for the repair and replacement of existing structures.

Towns and cities, said Mr. Brown, are rated by their Main Streets, most of which, like Topsy, just grew. Wide-awake towns, he said, try to make their Main Streets represent their importance and call in architects for this purpose. A number of photographs were used to illustrate typical Main Streets before and after the "face-lifting" process.

Mr. Brown cited as an example of the benefits of such a program a building in a small town in Missouri. This building, in a dilapidated condition and only partly occupied, was valued at $5,000. The owner invested an additional $8,500 to improve the building and now gets an 11 per cent. return on the $13,500 invested in place of the former return of 7 per cent. on $5,000. He further profited by a reduction in fire-insurance rates of $1.50 per hundred. Mr. Brown also cited other cases in which towns have benefited materially from such improvement programs. The spiritual value, he said, is also important, as citizens take pride in such a town and such pride results in a general improvement in the standard of living conditions.

Frank T. Sheets, president of the Portland Cement Assn., and former chief engineer of the highway department of Illinois, next delivered a message entitled *The Concrete Industry Moves Forward*. In reviewing the history of cement and concrete he said that since 1900 concrete has become more widely used than any other building material and that this progress was not accidental. Great engineers and builders were credited with planning its progress and the end is not yet in sight.

Left to Right: Sam Paturzo, V. Paturzo Bro. & Son, Inc., Baltimore, Md.; J. J. Buzzell, Fred Leach, and Jack Franklin, Besser Mfg. Co.; Lacy Peyton, Peyton Concrete Products Co., Benton, Ill.; F. W. Wehrum, and L. E. Edlin, Besser Mfg. Co.; J. D. Love, McCrady-Rodgers Co., Pittsburgh, Pa.

Concrete products, according to Mr. Sheets, have become an important factor in the building industry and he cited the progress made since simulated rock-faced blocks were used only for foundations. Concrete units, he said, now look like concrete and are used for all conceivable purposes and the industry has permanently emerged from backyards and basements.

Mr. Sheets reminded his audience that until a few years ago most building codes excluded concrete products. He also cited the results of research and its value in giving the producer all possible data to enable him to make a superior product. Research is the basis of progress, he said, and from 40 to 60 men have been working in the Portland Cement Assn. laboratory for the past 20 years to make possible the production of better and more serviceable concrete and to extend its use. Closer coöperation between technicians and the users of concrete, he thinks, would make the results of research even more valuable.

In discussing the existing markets for concrete products Mr. Sheets said that housing has a huge backlog and is on an upward trend which should last five or six years. Large-scale housing he expects to become an important factor. Growing realization that fireproof concrete buildings are cheaper than flimsier types over a period of 10 to 15 years is also having its effect.

Mr. Sheets then cited the program of the P. C. A. for 1939 which calls for:

1. The creation of public acceptance and appreciation of concrete through newspaper and industrial advertising, editorials, etc.

2. Research and development at laboratories and field offices and coöperation with universities and other research agencies.

3. The distribution of sales and technical pamphlets to help sell the product, available at cost.

4. Supplying illustrations for advertisements.

5. An educational campaign among bankers and others responsible for much of the building.

6. Continuation of coöperation with architects in developing new applications for concrete.

7. Contact with governmental and other agencies and keeping them informed of the progress in concrete technology.

8. Representation on the A. S. T. M. and other specification-writing agencies.

Mr. Sheets reminded his audience that the Portland Cement Assn. is an educational, promotional and research organization only. It does no selling and this must be done by the individ-

ual producer. In closing he advised selling concrete first, then one's own product. A quality product is the best advertisement and a sold employee is the best salesman. He urged producers to be listed in classified telephone directories, to establish regular contacts with realtors, architects, bankers, builders, etc., and to develop demonstration homes to show prospects.

Large-Scale Housing—United States Housing Authority Begins to Eliminate Slums, was the subject of a discourse by E. M. Culligan, United States Housing Administration. The speaker cited the federal housing project in Jacksonville, Fla., as an example of the type of work being done and of the market for concrete products in it. Aggressiveness is necessary, he said, to sell these jobs to the local authorities who propose the projects and the architects who design them. The U. S. H. A. either accepts or rejects these projects and provides financial and technical assistance, but has nothing to do with the purchase of materials.

As the main objective of this program is low-rent housing, long-term amortization and low maintenance costs are necessary. According to Mr. Culligan, this program is designed to reach families with annual incomes of from $450 to $1,000. He said that commitments have already been made for the expenditure of about $700,000,000 to house 160,000 families. About 38 per cent. of this money goes into the purchase of building materials.

The last speaker was Oscar W. Rosenthal, president, Illinois Builders League, who discussed *Organization—The Keynote of Progress in Industry.* Mr. Rosenthal briefly reviewed the history of the league and its aims and went into some length on the spiritual value of building.

At its sessions on Thursday morning following the joint meeting of the preceding day, Dan F. Servey, chairman of the board of directors, presided. Following the showing of a few reels of motion pictures the group heard E. W. Dienhart, assistant secretary, tell of some new types of concrete-masonry walls being tested at the National Bureau of Standards. Among these, Mr. Dienhart explained, are (1) a hollow double wall with 4-in. interior and exterior shells with metal ties, (2) a brick exterior with concrete-masonry back-up in which the bricks are set on edge for two courses and used flat for the third, or bond, course, (3) another brick-faced wall using split bricks with 6-in. concrete-masonry units for back-up, and (4) a straight 6-in. concrete-masonry wall for use in single-story structures enabling it to compete directly with wood construction on initial cost alone.

All these wall specimens are apparently meeting expectations in the tests, Mr. Dienhart reported. Cost figures, preliminary of course, indicate that the hollow double wall can be supplied, including mortar and labor, for about 45 c. per sq. ft. of wall surface, the brick-on-edge type for about 41 c., the split-brick-faced type for 48 c., while it is expected that the 6-in. concrete-masonry wall will cost no more than 31 c. per sq. ft.

Left to Right: M. Loniewsky and E. N. Leigh, Lake Shore Cement Products Co., Michigan City, Ind.; Bill Ochs, Multiplex Concrete Machinery Co.; Mrs. F. K. Hunsicker, Hunsicker Mfg. Co., Freeport, Ill.; Frank Muenzer, Multiplex Concrete Machinery Co.; M. E. Hunsicker, Hunsicker Mfg. Co., Freeport, Ill.

The tests will probably be completed in the summer of this year, according to Mr. Dienhart, and complete details will then be made available to manufacturers.

Hugh Robinson of the Underwriters' Laboratories, Chicago, Ill., traced the work of the laboratories fire-retardant tests on concrete masonry from their inception in 1920 until the present. The work was initiated, he said, by F. J. Straub, cinder-block pioneer, who resented the fact that concrete-block structures were being classified with frame construction and were forced to take the same high rate of fire insurance. These early tests gave an 8-in. wall of ordinary concrete block a 3-hr. fire-retardant rating, and others for different types of aggregates followed. Basic standards were developed so that individual manufacturers were able to obtain tests and ratings on their own products. Ratings of 3 hr. have now been established for all standard concrete building units except those made with Waylite-Superock aggregates, which have obtained 4-hr. ratings. The so-called solid concrete block, having 25 per cent. or less of its volume in core space, also has attained a 4-hr. rating. The best rating for clay tile is 2 hr., Mr. Robinson reported.

The speaker told of the inspection service offered by the Laboratories to assist in maintaining high-quality production in individual plants. Periodical tests aid both the manufacturer and the inspector of material in their common aim to provide builders with uniform and reliable products. These certificates are not issued to manufacturers but for the specific jobs in which they are to be used. A record is kept of all certified shipments for the guidance of insurance companies and building commissioners.

Building departments in various cities welcome the relief from frequent inspection and testing afforded by material inspected by the Laboratories; in fact, many building codes demand that all material be thus certified as do most government construction jobs, while school architects are insisting that the Laboratories' certificate of approval be issued before units are acceptable for the construction of school buildings. The inspection service not only guarantees a high-quality product to the user but lower insurance rates as well. Rating bureaus in 37 states give such concrete masonry the same insurance rate as solid-brick construction in residences and in 41 states give it a preferred rating over clay tile in industrial buildings.

Building a Successful Concrete-Products Business in a Small Community was the subject of the talk of A. P. Nelson, head of the Spencer Block Works, Spencer, Ia. Mr. Nelson began producing concrete blocks in 1902 and traced the growth of his company from the hand machine installed at that time to the modern equipment he now uses and the remarkable distribution he has

G. M. Friel, Anchor Concrete Machy. Co.; John J. Wanicek, Nelson Concrete Stone Co., Baltimore, Md.; Eugene F. Olsen, Stearns Mfg. Co., Adrian, Mich.

gained for his product. Spencer is a town of but 6,000 people and during his first ten years in business Mr. Nelson supplied only the local demand. In 1912 he began shipping his product out of town and he has been doing so ever since. He remembers 1931 as a banner year for local demand, however. Fire, starting in a drug store, destroyed nearly every building in Spencer—except those built of concrete—and business boomed at Mr. Nelson's plant. In the process of rebuilding more than 1,000,000 concrete bricks and about 100,000 concrete blocks were employed.

More than 100 building-material dealers are handling the product of the Nelson plant, which, besides building units, makes joists, pipe and drain tile, and as many as 24 carloads of units have been shipped by the plant in a single day to destinations in Iowa, Minnesota and South Dakota. In 1937 a full-time sales representative went to work. Finding that many dealers were not pushing the sale of concrete products, this representative, in his car painted with every color in the spectrum, began calling on citizens, farmers —anyone who would listen—doing promotion work for concrete. Now Mr. Nelson has three men so employed. He also advertises in the newspapers, but he believes his rolling stock—seven delivery trucks and the salesmen's cars —are his best advertising medium. It is common practice to send this fleet of trucks several miles out of the way when making a delivery to enable them to pass through the main streets of four or five towns that wouldn't ordinarily see the shipment. Plenty of bright paint and easy-to-read lettering on the trucks do a real advertising job and the drivers are just as sales conscious as Mr. Nelson; whenever they see anything that looks like a possible sale they climb out of their trucks and, if they don't make a sale, they report the prospect and a salesman follows later.

Three years ago Mr. Spencer built the Spencer "House of To-morrow," which was visited by 31,000 persons in the two months that it was open. Made entirely of concrete masonry with precast joist floors and roofs, it did much to publicize the value of concrete for house building. He now occupies it as his home.

Not only does Mr. Spencer feel that the age of concrete has just begun; he

E. J. Goes and John Poulter, Koehring Co.; H. W. Hartmann, American Engineering Co., Peoria, Ill.; C. A. Koehring, Koehring Co.

also feels that recent developments in concrete-products machinery are going to make it easier and more economical for the producer. To-day's equipment, he declares, is more economical, foolproof, and longer-lasting. Less time and money will have to be spent on this end of the business in the future, enabling the producer to do a better merchandising job, he believes.

Sam Paturzo, of V. Paturzo, Brother & Son, Baltimore, Md., cinder-block manufacturers, told of the success his company has had in the sale of its product in several large-scale housing projects in Baltimore. Government endorsement of concrete masonry in the construction of slum-clearance projects

W. D. M. Allan, Portland Cement Assn.; E. M. Culligan, U. S. Housing Authority; David Wright, Portland Cement Assn.

and the like is doing much to build up the confidence of architects, engineers and builders in the material.

Progress during the year by the industry was summed up in a talk by President Krier, and his hope for the future of concrete masonry and the industry at large was well received by his listeners.

A brief report was made by Harve E. Kilmer (Iowa Concrete Crib & Silo Co., Des Moines, Ia.), of the progress being made on the durability and strength tests of concrete units now under way at the University of Wisconsin. Early indications are that units produced by vibration will show exceptionally high quality, strength and durability, it was indicated.

The final session of the convention began Thursday afternoon with President-elect Kilmer in the chair.

First on the program came a few well-chosen and pointed remarks by F. J. Straub of New Kensington, Pa., one of the industry's pioneers. The next speaker was H. F. Clemmer, engineer of materials, District of Columbia, Washington, D. C. Mr. Clemmer's subject was *The Practical Application of the Use of Calcium Chloride in the Manufacture of Concrete-Masonry Units*. Most of the plants in and around Washington are now using calcium chloride as an admixture, according to Mr. Clemmer.

By assuring positive and uniform conditions throughout the mixture, the use of calcium chloride will result in a uniformly higher quality product. Strengths usually attained at the end of three days are obtained at the end of a 24-hr. period, ultimate strength is increased, and the lack of uniformity due to alternate wetting and drying is eliminated when calcium chloride is used, Mr. Clemmer stated. He is also of the opinion that the admixture tends to densify the product and lower absorption. Calcium chloride by increasing workability allows the use of the minimum amount of water, the resulting decrease in the water-cement ratio producing higher strengths and an accompanying increase in density, hardness and the ability to resist shrinking. The use of calcium chloride with high-early-

Purd B. Wright, Lone Star Cement Corp.; R. M. LaDue, Concrete Pipe Machinery Co.; Gus Main, Kansas City Concrete Pipe Co., Kansas City, Mo.

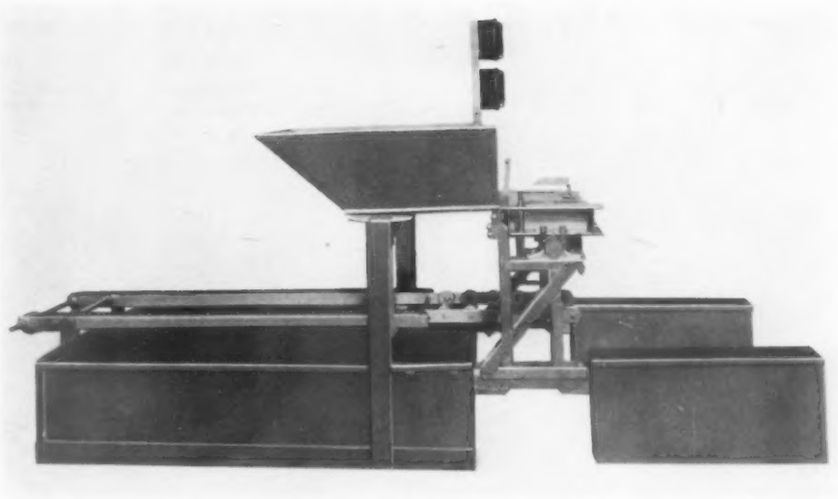
strength cements is particularly valuable, according to the speaker.

Since the rate of set and the development of early strength of Portland cement becomes progressively slower as the temperature falls, the value of calcium chloride in concrete products is materially increased in cold weather. Mr. Clemmer pointed out that units cured at a temperature of 90 deg. have 10 per cent. more strength that those cured at 70 deg. The period of protection or inside storage can be reduced one-half or more and the danger of frost damage correspondingly decreased when calcium chloride is an integral part of the mix.

Contrary to the belief of some producers, calcium chloride is never responsible for efflorescence, Mr. Clemmer reported. This condition is due to soluble salts in the cement or aggregates used and the presence of moisture in the wall plus the existence of capillary channels through which the moisture-carrying dissolved salts can find their way to the surface. Calcium chloride, due to its ability to take up moisture from the air and to dissolve in that moisture, can not be recrystallized and deposited, he said. On the other hand, Mr. Clemmer believes that the presence of calcium chloride hastens the development of efflorescence if it is going to occur and the condition can be cleared up more quickly by adequate wall treatment.

Ernest Spickelmier (Spickelmier Fuel & Supply Co., Indianapolis, Ind.), told the audience something about his company's new plant. After having been in business for 31 years and having used at one time or another most of the equipment offered for the production of concrete units, the concern has now standardized on the Stearns Joltcrete machine. He reported that he was well pleased with the product now being turned out. It is his belief that the trend toward vibration will continue and that the industry as a whole will benefit through its adoption. The units now being produced by his company are smooth, have a better texture, and in general are highly satisfactory, particularly when light-weight aggregates are used, he declared.

Five concrete silos 90 ft. high and 16 ft. in diameter are used for storage at the Spickelmier plant, two being employed for sand and gravel, two for fine and coarse Haydite, while the fifth is used for the storage of bulk cement which this company has used for 25 years. Each of the two Joltcrete machines makes three units at a time with one machine operator and one offbearer working at a machine. The offbearer transfers two of the units to the racks, the other being taken off by the operator. The entire plant is concrete-floored and one gasoline lift truck moves the loaded racks to the curing room and returns the empty racks to the machines.



The Hollostone concrete-tile machine, which produces the units by vibration, has recently been improved to a great extent. Welded structural steel is now employed to increase rigidity and assure longer life. The operating cycle is about 25 sec. and three 4-in. by 8-in. by 12-in. tiles or their equivalent are made at each operation. The machine is made by the Hollostone Co., North Hollywood, Cal.

Because of extreme hoarseness due to a cold, Frank Muenzer, president of the Multiplex Concrete Machinery Co., Elmore, O., was unable to give his scheduled talk on the performance of his newer machines in the production of units. In his stead P. J. Rega, who operates a Multiplex-equipped plant at Mt. Pleasant, Pa., regaled the audience with a number of humorous anecdotes and episodes occurring in the course of his busy career.

C. B. Fellabaum (National Cement Products Co., Toledo, O.), whose latest plant is Besser equipped, made a brief talk concerning his company's operations. Materials are received either by truck or by railroad and are elevated to overhead bins, which are located directly over the block machines and mixers. Cinders are crushed at the top of the bin structure. Units up to 4 in. by 8 in. by 18 in. are made regularly. There are three under-cover storage, houses, each 35 ft. by 135 ft. in size.

The final event of the gathering was the banquet on Thursday evening and it lived up to its advance notices of "a delightful and enjoyable evening—all fun, no speeches" as the many guests who attended will attest.

No decision was made at the convention regarding the place and date of next year's meetings. Both Cleveland and Milwaukee made bids for the gatherings, the Milwaukee delegation having paraded through the convention exhibit on its arrival on the first day led by an accordion artist and an enterprising enthusiast who set off bunches of firecrackers on numerous occasions during the parade.

The Santee-Cooper Authority has contracted with the Pennsylvania-Dixie Cement Corp. for 600,000 bbl. of cement at a reported $1,250,000 for delivery to the Santee-Cooper power and navigation project in South Carolina.

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ADDS THIRD PRE-MIXED CONCRETE PLANT

THE Arundel-Brooks Concrete Corp, Baltimore, Md., has been one of the leading producers of ready-mixed concrete since its Wolfe St. plant was put in operation early in 1932. This plant was a show-place of the industry then and is still considered to be one of the best central-mixing plants in existence. In 1936 the company built a new central-mixing plant at Sparrow's Point, Md. The third central-mixing plant, with which this article is chiefly concerned, is located in Woodberry, a suburban section of Baltimore, and was completed in May, 1938. While it is not as large as the Wolfe St. plant, this new plant is yet one of the largest and most interesting new commercial concrete plants built in recent years. Among its features are the auxiliary aggregates-storage system and the unusually extensive safety precautions.

Each of these three plants serves a different type of construction work. The Wolfe St. plant is in an industrial section of Baltimore near the main business district. Most of its output is used for commercial building construction. The Sparrow's Point plant is in an industrial section 9 mi. east of Baltimore. It supplied about 50,000 cu. yd. of slag concrete for a building program of the Bethlehem Steel Co., which may be resumed if steel output increases. Most of the output of the new Woodberry plant is used in the construction of houses, business buildings, street paving, etc.

There is considerable similarity in the design of these plants, all of which are central-mixing operations. S. B. Brooks, vice president and general manager of the company, is a firm believer in the superiority of plant-mixed concrete over that mixed in transit. Plant-mixed concrete, according to Mr. Brooks, is denser and more uniformly mixed and the extra expense of a plant mixer is compensated for by the fact that the company's 3-cu. yd. mixer trucks are used as 5-cu. yd. agitators. No shrink mixing is done, each batch being mixed in the plant for from 1 to 2 min. The hauls are comparatively short and never require more than 45 min. time.

The growth of the company's business is evident from the steady increase in the size of its fleet of agitator trucks. When starting out in 1932, a fleet of seven 4-cu. yd. Chain Belt Rex agitator trucks was purchased. The company now operates 36 Chain Belt Rex agitators, of which half are of 4-cu. yd. and the other half of 5-cu. yd. capacity. Most of these are mounted on Mack trucks, but some Autocars are also used. Ten of the truck mixers were purchased in 1938.

Early in 1938 a Cummins Diesel engine was installed in one of the Mack trucks and this proved to be so satisfactory that two additional installations have since been made. These engines have proved to be more economical than the gasoline engines they replaced. A slight loss of flexibility is offset by their greater power on hills, according to Mr. Brooks.

The new Woodberry plant. At left is the auxiliary aggregates-storage system. A car of bulk cement is being unloaded at right.

Slag-concrete plant at Sparrows Point which was built to supply a steel-mill construction program.

It is said that sand and gravel are used exclusively in all ready-mixed concrete sold in this vicinity by this and other companies. This is due to the fact that crushed stone is much higher in price. This choice of materials is responsible for an unusual condition at the Woodberry mixing plant. There sand and gravel are brought in from a distant pit of the Arundel Corp. by trucks while only a few hundred feet away is a crushed-stone plant taken over by the company early in 1938.

The new Woodberry plant is on an extension of the Clipper Mill Road, about 5 mi. northwest of downtown Baltimore. It is on the main line of a branch of the Pennsylvania R. R. It was designed by the Blaw-Knox Co., which supplied all the bins, batchers and structural steel.

Cement is discharged from special bulk-cement cars into a hopper, which is closed with a canvas boot when not in use. A 20-ft. Jeffrey screw-conveyor feeds the cement to an 80-ft. steel-in-

The Wolfe St. plant. Note unloading shed for bulk-cement cars at right and the dual cement elevators.

closed bucket-elevator. This discharges the cement through a chute into a revolving spout for distribution to the four compartments of a 1,200-bbl. Blaw-Knox circular steel storage bin. An air vent on the top of this bin keeps the air pressure at atmospheric level. Both high-early-strength and standard Portland cements are stocked.

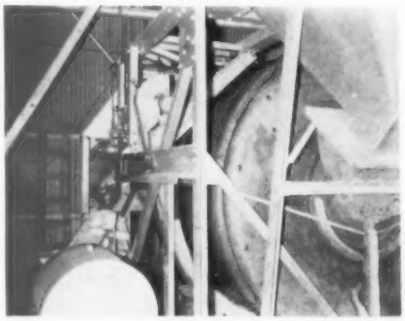
The sand and gravel used as aggregates are hauled by trucks from the Carney plant of the Arundel Corp. on the Joppa Road 5 mi. from the plant. The trucks dump their loads into two hoppers, one for sand and the other for gravel. The discharge gate of either hopper can be closed while material is being withdrawn from the other. Either material is discharged on a 31-ft. tunnel belt-conveyor. A 70-ft. steel inclosed belt-bucket elevator discharges the material through a flap gate into either of two chutes.

One chute feeds a revolving spout serving the four compartments of the 200-ton capacity Blaw-Knox plant-

The two cement screws which feed the cement-weighing batcher and the cable controls for the valves.

storage bin. Sand and two sizes of gravel—1½-in. and ¾-in.—are usually stored.

The other chute from the elevator feeds a selective 3-way gate with chutes to each of three 400-ton Blaw-Knox steel silos. These silos are mounted on concrete foundations and are each 18-ft. in diameter by 32-ft. high. Aggregates are discharged from these silos through bottom-discharge hoppers and gates on a 50-ft. horizontal tunnel belt-conveyor. This feeds the material on the belt-conveyor from the



The 4-cu.yd. concrete mixer at the Woodberry plant with feed chute in foreground.

truck hopper which has already been described. This auxiliary storage system holds enough material to operate the plant for 4 days in an emergency.

Under each of the four cement bin compartments is a rotary valve. These are arranged in pairs, each pair feeding a 10-in. by 10-ft. Jeffrey inclined screw-conveyor to the cement batcher. Only one screw conveyor is used at any time, drawing cement from one bin compartment. The operator can start or stop the screw-conveyors by means of push-button switches. The rotary valves are opened and closed by means of cables attached to levers on the valves. With this arrangement the operator, without leaving his post, can switch the feed from one bin to any of the other three bins.

The Blaw-Knox cement-weighing batcher is connected to a Kron dial scale. In weighing out a batch of cement the scale is first set at the desired weight. As the needle of the scale approaches "zero" a photoelectric cell automatically shuts off the screw-conveyor motor.

Sand and gravel are fed into the 2-compartment, 5-cu. yd.-capacity aggre-

The four rotary valves which feed cement from bin compartments to cement screws. Motor-reducer drives of screws are shown.

gate weighing batcher through clam-shell gates, one under each of the four bin compartments. These gates are operated manually through levers. The desired aggregates are discharged in sequence into this batcher and are weighed cumulatively on a Kron dial scale.

The contents of the aggregate and cement batchers are discharged simultaneously into the Chain Belt Rex 4-cu. yd. mixer. Water from the city mains is measured in a Chain Belt 200-gal. siphon-type tank. The desired volume setting is made by raising or lowering the discharge valve by means

The cement and aggregate batchers and scales. Levers for aggregate gates at right.

of a rack and pinion. Concrete is discharged from the mixer into a hopper fitted with a rubber sleeve which fits into the charging door of the agitator. This hopper is raised and lowered by means of a push-button switch and is moved back and forth by means of a lever.

A load of concrete can be batched, mixed and discharged into an agitator in 3 min. The actual mixing time ranges from 1 min. up to 2 min., which is the time specified for city work. The plant operator looks down through an opening to be sure the agitator is in place and the charging door open before he dumps each batch from the mixer. He can also see the condition of the concrete. If too wet, he can add a little more aggregates and cement. If too dry, water is added from a 30-gal. auxiliary water tank.

Diesel engine which was installed in one of the company's agitator trucks.

The main switches for all the equipment in this plant are conveniently located on the batching floor, giving the operator complete control over all operations. Also convenient are charts giving the proportions for all the mixtures for which there might be a demand.

Most of the orders for this plant are received direct, but a private telephone line to the company's main office is used for the transmission of orders. Usually 8 of the company's fleet of trucks are used at this plant. One of the largest contracts supplied from this plant was one of 20,000 cu. yd. for the new Howard St. bridge in Baltimore.

A number of improvements have been made to increase the capacity of the Wolfe St. plant since it was built. The original automatic control system, one of the first to use a photoelectric cell, is still in use. Additional aggregate- and cement-storage bins have been built for another plant mixer to supplement the original 5-cu. yd. Ransome mixer. This can be installed on short notice. A second cement elevator was installed to eliminate the possibility of delays due to breakdowns and a third cement screw to the batcher has speeded up the production of concrete. A Teletype system, connecting the operating floor of this plant with the company's main office across the street, gives the operator a duplicate of each order to work from. This plant was designed by the Stephens-Adamson Mfg. Co. which also supplied most of the original equipment.

The Sparrow's Point plant is smaller, having a 4-cu. yd. Ransome mixer. This plant was designed by the Blaw-Knox Co. which supplied the bins, batchers, structural steel, etc. Kron batcher scales and Columbus conveyors and elevators are used. Water is measured in a Ransome tank. This plant is kept in such condition that operations can be resumed on short notice.

Slag aggregate for this plant is obtained from the Maryland Slag Co., in which the Arundel Corp. has an interest. The slag plant gets its supply from the mills of the Bethlehem Steel Co., using a modified open-pit system of cooling the molten slag.

Concrete sales are handled entirely by the company's staff. All the concrete produced is guaranteed by the E. L. Conwell Co., Philadelphia, Pa., which has inspectors at each plant when it is in operation. All the mixes are checked by these inspectors who make strength and moisture-determination tests daily.

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Combination dredge and tow-boat bringing in a loaded barge.

Another Aggregates Producer Makes Concrete Units Pay

THE success of the Caruthersville Sand & Gravel Co. at Caruthersville, Mo., in the manufacture of concrete products is striking evidence that the aggregates producer is best situated to serve this market, even if on a small scale and in a comparatively poor and sparsely settled section of the country. Caruthersville is in cotton country, on the Mississippi River, 60 mi. southwest of Cairo where the Ohio and the Mississippi meet, and most of the population consists of white and Negro sharecroppers. This old-established aggregates producer first went into the concrete-block business in 1922 and has developed it until it now uses a large part of the aggregates produced. In 1937 80,000 concrete blocks were sold and the 1938 total was not much less.

H. C. May, manager of the company, in 1921 bought a half interest in the company. When it was merged in 1927 with the Missouri Sand & Gravel Co., owned by N. W. Helm, these two men became partners. In those days most of the output of the plant was used for road work and between 1923 and 1932 all the sand was furnished for 70 mi. of U. S. Highway 61 between Sikeston, Mo., and Blytheville, Ark. This is one of the stretches of highway along which thousands of destitute sharecroppers were recently encamped.

When the company went into the block business in 1922 a hand-operated block machine was purchased from a mail-order firm. With this machine three men were able to make 100 blocks daily. In 1937, after the record spring floods, a Multiplex double - stripper block machine, also hand-operated, and a Stearns ½-cu. yd. mixer were purchased. With this equipment three men can now make 500 blocks daily.

The vibrating screen on the dredge.

The coarse sand used in the manufacture of these blocks is dumped from trucks into a shallow bin, from which it is shoveled by hand into the skip bucket which feeds the mixer. The mixture used consists of 6½ sacks of cement to a cubic yard of sand and 2 gal. of water per sack of cement. This makes a dry block which is sprinkled as soon as it is made and is kept wet for a week.

Coarse sand being shoveled into skip bucket which supplies the mixer.

A special face plate can be used in the machine to make a simulated brick-face block. This type of block can be colored. The faces of the blocks are first sealed with "Aridol," a colorless waterproofing liquid made by the Missouri Paint & Varnish Co. Two coats

Some of the company's employees, with H. C. May, manager, at right. The mark across the top of the window at left shows the level reached in the 1937 flood. Note anchor wires at left to keep building from floating away.

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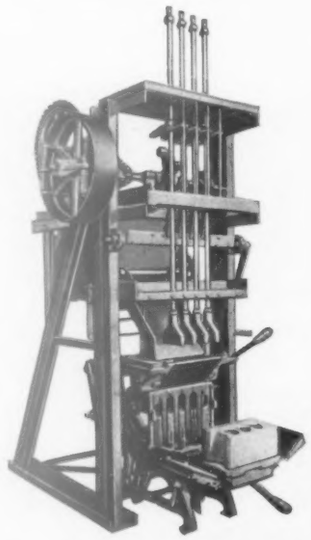
Write for Bulletin UNIVERSAL Concrete Pipe Co. Columbus, Ohio



Recognized Everywhere

The Hobbs Jr. Face-Down Block Machine is recognized everywhere as the great general purpose machine of the concrete-products industry. Famous for its wide range of sizes and the variety of blocks it can produce. As illustrated, it is equipped with striking and finishing device, shown under the floor-type tamper and with power feeder.

Hobbs block machines, Anchor tampers, Anchor Jr. strippers, Stearns power strippers and Joltcrete, Stearns mixers, and Cast Iron and Press Steel pallets, Straublox oscillating attachments, etc. Repair parts for: Anchor, Ideal, Universal, Stearns, Blystone mixers and many others.

ANCHOR CONCRETE MACHINERY CO.
G. M. Friel, Manager Columbus, Ohio

of concrete paint are then applied with a hand brush.

Other concrete products are also made by hand. The best sellers among these are foundation blocks for houses, of which about 6,000 are sold annually. These are in the form of truncated pyramids and are used to support the posts of sheds and the frame houses in which most of the people in this section live.

The dredge *New Era,* which produces the sand and gravel, was converted in 1926 from a stern-wheel towboat and now serves both purposes. It operates on the Mississippi River, usually within a mile of the plant. Locations for dredging are selected according to the types of materials desired. Coarse sand containing about 25 per

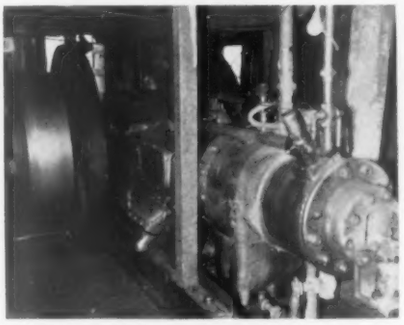
The double-stripper. Mixer at right.

cent. gravel is the coarsest material available and this is dredged from the main channel of the river which is 2¼-mi. wide at this point.

The dredge is powered by a 50-hp. Superior 1-cyl., horizontal semi-Diesel engine, which drives the stern wheel through a belt and a Superior Type C reversible clutch. When dredging at anchor, this belt is slipped off the drive pulley of the engine and a belt connects it with the pulley of the 6-in. Morris dredge pump. A 40-ft. suction nozzle is used. The pump line discharges into a box on the top of the boat which breaks the force of the discharge. From

The 6-in. dredge pump. Cable and pulley at the right drive the vibrating screen.

the box the material is discharged on a 42-in. by 6-ft. Universal 2-deck vibrating screen, which is equipped with sprays for washing. Bark, twigs and other trash are removed by the top deck of this screen. As only one barge is loaded at a time, sand and oversize are



The 50-hp. semi-Diesel engine which propels the boat and operates the dredge pump and screen.

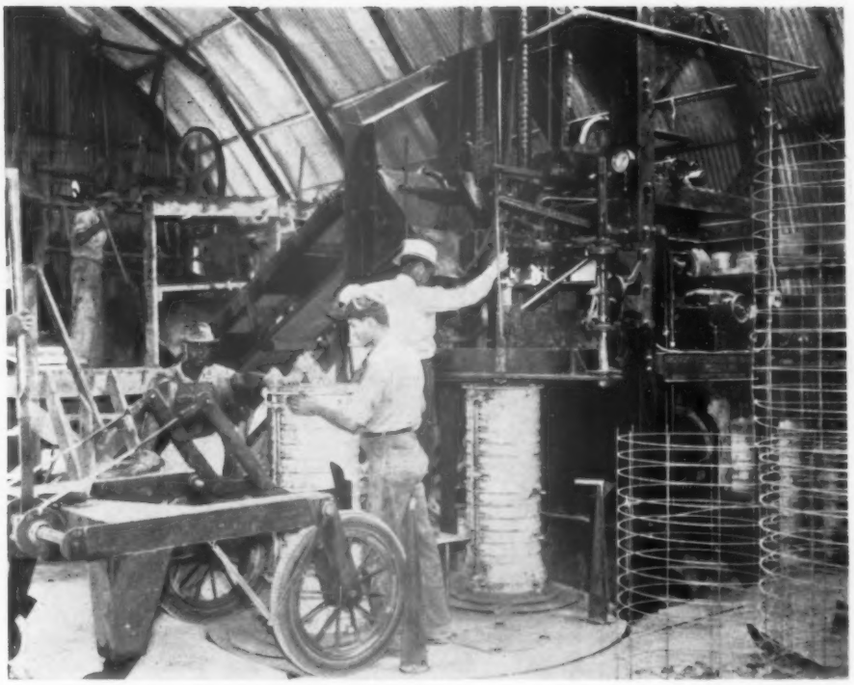
discarded when gravel is being produced. Similarly when sand is sought, the gravel is discarded. Using this rather inefficient system the dredge has a daily capacity of 300 cu. yd. of sand, 200 cu. yd. of road gravel or 100 cu. yd. of concrete gravel. Two men are required to operate the dredge.

Two 100-cu. yd. wooden barges are used. While one is being loaded the other is being unloaded at the company's dock. A steel stiff-leg derrick with a 75-ft. boom and a 1-cu. yd. bucket unloads these materials on stockpiles or into truck-loading bins. An Orton & Steinbrenner crane, with a ¾-cu. yd. bucket transfers the stock-piled materials either into the two truck-loading bins or into trucks. This was originally a steam crane but is now operated by a 30-hp. electric motor.

The personal sales efforts of the two partners are supported by advertising in local newspapers within the 70-mi. radius in which its products can compete. Calendars, blotters, pencils, etc., are also distributed. These advertising efforts, which Mr. May credits with most of the sales made, cost the company an average of $650.00 annually.

The Webster Mfg. Co. and the Weller Mfg. Co. have operated under a trusteeship for a period of several months. Effective Jan. 18, 1939 a new organization, Webster Manufacturing, Inc., succeeded these two companies. The new organization has been successful in securing adequate working capital to carry on extensive manufacturing operations. The original company was first established in 1876 and for 60 years has been one of the foremost concerns manufacturing elevating, conveying, power transmission, chains, special machinery, sheet steel work, malleable and grey iron castings. This concern has a well qualified engineering staff and sales organization.

The headquarters and general offices are located at Tiffin, O.



This view shows one pipe being made while another is being loaded on a cart to be hauled away. Mixer and concrete conveyor are in background.

New Orleans Aggregates Firm Enters Concrete-Pipe Field

ONE of the latest aggregate producers to branch out into the manufacture of concrete products is the Louisiana Materials Co. of New Orleans, La. This company has been a commercial producer of sand and gravel and shell for the past seven years. In May, 1938 a new concrete-pipe plant was put in operation at the company's yard on the Industrial Canal and U. S. Highway 90, 5 mi. east of downtown New Orleans.

Aggregates for the pipe plant are shoveled into wheelbarrows, from which they are dumped into a 1-cu. yd. skip-bucket feeding a 25-cu. ft. Besser mixer. Cement is dumped into the bucket from sacks. Concrete is discharged from the mixer into a hopper, from which an 18-in. inclined belt-conveyor carries it to the pipe machine. A 20-hp. Reliance electric motor drives a shaft through Dayton V-belts. The mixer is gear-driven through a clutch from this shaft. The hoist operating the skip-bucket is also gear-driven from this shaft through an individual clutch.

The pipe machine is a Concrete Pipe Machinery Co. McCracken Model H dual packer-head machine with separate revolving packer heads for the bell and body of the pipe. A hydraulic lift controls the speed of travel of the upper packer head, making it possible to control the density of the pipe by the number of revolutions per inch of travel. This lift also makes it possible to lift the packer head out at any time in case a reinforcing cage should become entangled or in any other emergency. This control is also an advantage in making pipe less than 4 ft. in length as the packer head can be made to travel only the length of the pipe, speeding up the output considerably.

The pipe machine is driven by a 50-hp. squirrel-cage motor which drives a 3-speed transmission through a countershaft and clutch. Both packers are driven through V-belts from this transmission. The hydraulic-lift control unit is also driven from the counter-shaft and the concrete belt-conveyor is driven through a 6-speed transmission. The pipe turn-table on this machine accommodates four pipe molds but only two are used when making large pipes. McCracken outer molds are used.

Plain and reinforced sewer pipes are being made in sizes ranging from 6 in. to 36 in. in diameter. Only the bell-end type of pipe is now being made as the tongue-and-groove type is permissible in New Orleans only in the large sizes. Drainage pipe for highways is also made only in the bell-end type and in six sizes up to 36 in. in diameter. Larger pipe is seldom used in the New Orleans area because of the flat topography and the shallow fills.

In an 8-hr. day this McCracken machine can produce 150 units 30 in. in diameter and 4 ft. long. The smaller pipe sizes can be made at the rate of 100 per hr. Highway markers are also made by hand at this plant. Most of the output of the plant is delivered by trucks but railway and waterway shipments can also be made.

The finished pipes in their molds are

The 1-cu.yd. mixer with skip bucket which supplies it with aggregates and cement.

The plant with some of the pipe stock in the foreground. In the left background are the shell, sand and gravel stock-piles along the canal bank.

carried off by 4-wheeled off-bearing carts with which one man easily handles a 30-in. pipe 4 ft. long. No pallets are required in storing these pipes and the molds are removed immediately. The pipes are sprayed inside the building for from 48 to 72 hr. depending on specifications, before they are moved to outdoor storage. A portable light-cable arrangement with plugs along the wall of the curing building eliminates the necessity for expensive fog lights. The curing section of the all-steel building is 60 ft. wide and 85 ft. long.

An M. M. Smith hand-operated machine is used to make 45- and 90-deg. bends and other fittings. Wire reinforcing cages are rolled on a power-driven roller and are welded by an Allen spot-welder. A 3-point combination hydrostatic and crushing-strength testing machine is used in connection with a Blackhawk recording Loadometer to test the pipe.

The company operates a fleet of tugs and barges which are used in its sand-and-gravel and shell business and in its work as a towing and dredging contractor. Dredges are used for the production of gravel from the Mississippi River, sand from the Pearl River, and oyster- and clam-shells from Lake Pontchartrain. All the washing and screening is done on these dredges.

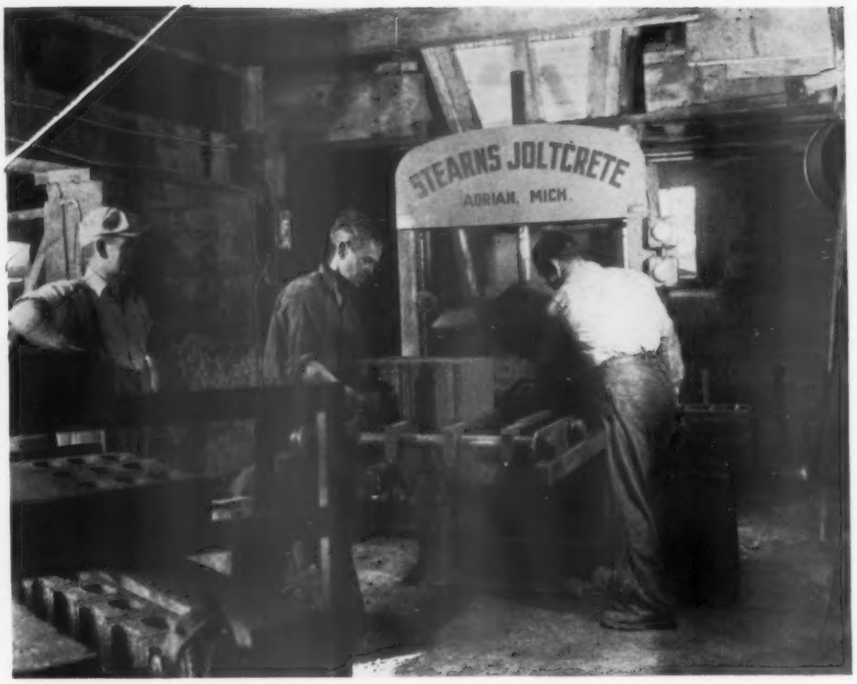
At the company's yards these materials are transferred by cranes to stock-

A finished pipe in its form being picked up by an off-bearing cart.

piles or to a 200-ft. Portable Machinery Co. belt-conveyor which carries them to piles at the pipe plant. This conveyor is also used for loading cars.

The main office of the Louisiana Materials Co. is in the Whitney Bldg., New Orleans, La. The officers of the company are: W. L. Stevens, president; E. A. Caldwell, vice-president and operating manager; C. O. Harris, secretary and treasurer.

K. B. McCracken is superintendent of the pipe plant.



New block machine in the plant at South Plainfield, N. J.

Installs Vibration Machine to Meet Rigid Block Requirements

AFTER eleven years devoted to the manufacture of tamped concrete wall units, the Guaranteed Concrete Block Co. of South Plainfield, N. J., is one of the first plants in the East to adopt the new method of making blocks by limited-amplitude vibration—vibrating the concrete while it is under pressure.

John Cardone and Gino Busecca, the owners, operate in a territory where building restrictions are rigid, material specifications are stiff and competition active. Such a situation requires modern plant equipment that can produce blocks of a high-quality standard, at production costs that will provide a reasonable profit margin.

The virtues of Stearns Joltcrete blocks, that had been made for a year in New Rochelle, N. Y., became noised about in other sections of the metropolitan area and outlying sections. Shown to architects, masons and builders in South Plainfield, they readily created an active demand. Cardone and Busecca revamped their plant, installed a Stearns Joltcrete machine and after eight months' operation report reduced production costs and a rapidly expanding demand.

Both cinder and gravel blocks are made. The materials arrive by freight car on the plant siding, are conveyed by a chain-bucket elevator and belt feeders to overhead bins, thence to the batcher and to an Ideal mixer. The mixed concrete is fed to the Joltcrete machine, which is automatic in its operation. With the pallets in position, an off-bearer touches a button which starts the automatic manufacturing cycle. The feed-drawer comes forward, with an excess of material, which is consolidated in the mold box by limited-amplitude vibration. The concrete receives 7,200 packing blows per min. When the feed-drawer recedes, it strikes off the surplus material, and drops the pressure head on the concrete in the mold box. The vibration continues under pressure. When the vibration ceases, the machine automatically strips the block up, the carrier is run in under the pallets, and three 8-in. by 8-in. by 16-in. blocks are withdrawn, 15 sec. after starting.

The blocks are placed on racks, which are taken to the steam room by a Lewis-Shephard hand lift truck and are cured in wet steam.

The product is sold chiefly through masons' supplies dealers. In Northern Jersey the Joltcrete blocks are achieving wide popularity among masons because of their true shape, straight lines, pleasing texture and ease of laying.

Manganese Concentrated by Flotation Methods

H. A. Doerner of the Bureau of Mines and Dwight L. Harris of the Electrometallurgical Research Laboratories, Pullman, Wash., recently published the results of a joint research entitled *Concentration of Low-Grade Magnesite Ores by Flotation*. The raw material was for the Chewelah, Wash., deposits, some of which measure hundreds of feet in width and merge indefinitely into the adjoining rock mass. The magnesite is interfingered with dolomite and contains disseminated calcite, talc, serpentine, quartz, and shale. Only by chemical analysis can the boundaries or total quantity of workable ore bodies be determined. At present, only the high grades of ore are mined, and a considerable proportion of the magnesite content of selected ore is discarded. It is believed that the new processes outlined in this paper will permit production of magnesite of equal or better grade at less cost than by present methods.

Three methods give promise of being commercially practicable, but larger-scale experiment will be required to determine which is best. The first method involves selective calcination and mulling followed by sizing. The second method is identical, except that the concentrate produced from treating low-grade ore is further concentrated by flotation. The third method requires no preliminary calcination but a two-stage flotation. Attempts to float magnesite directly from low-grade ores gave poor results; owing to the difficulty of depressing talc, the grade of product and recovery were both low.

Upturn in Building Continues Unabated

The strong upturn in building activity which got under way during the spring of 1938 has shown continued expansion since the opening of the new year. Contracts for private construction projects awarded in the 37 eastern states during January recorded a 39-per cent. gain over January of last year, according to the F. W. Dodge Corp. The January, 1939 figure for private work amounted to $103,757,000 as compared with $74,630,000 for January, 1938. During December, privately-owned construction totaled $110,036,000.

In commenting about the January construction record, Thomas S. Holden, vice-president of the F. W. Dodge Corp. states:

"In the past, the building industry moved forward as private construction advanced. As early as February, 1938, advance indications of increased private residential work began to appear. By May, privately-owned small house construction ran ahead of the preceding year. In September, the total volume for all types of private construction was greater than the corresponding period of 1937. This upward trend continued to the end of 1938 and expanded still further during January 1939."

With reference to publicly-owned construction, January contracts in the 37 states amounted to $147,916,000 as compared with $117,601,000 for January a year ago, representing a gain of 26 per cent. Not all P. W. A. projects were put into the Dodge contract figures for last year because in some instances only fractional portions of the entire projects were started, leaving the major portions to be put under contract later. Consequently there remains a considerable carry-over of public projects which should mature into the contract award stage later this year.

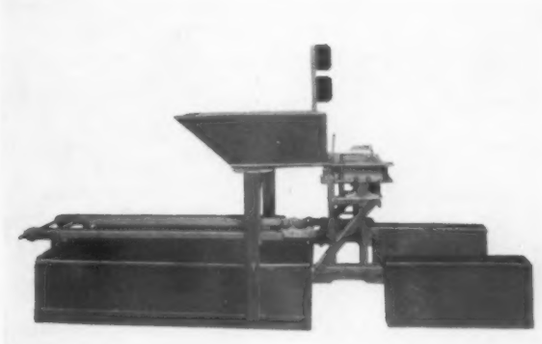
Concrete Industries Yearbook Available

The first edition of the *Concrete Industries Yearbook*, an 80-page semi-technical reference book for producers of concrete products and ready-mixed-concrete has come from the presses and is being distributed, without charge, to recognized producers in these fields. Published by PIT AND QUARRY as a reprint from the 1939 edition of *Pit and Quarry Handbook*, the book should be a welcome addition to any operator's library.

The section on "Concrete Units" covers the manufacture and marketing of concrete-masonry units as well as pipe, tile, burial vaults, ornamentals, etc. It was prepared by PIT AND QUARRY's assistant editor, Harry F. Utley, who spent four years doing publicity and promotional work with the Portland Cement Assn. before joining the staff of this magazine in 1930. The section on "Ready-Mixed Concrete," revised from previous editions of the Handbook, was written by H. F. Thomson, vice-president, General Materials Co., St. Louis, Mo., while Hayden Brooks of the Brooks-Taylor Co., Birmingham, Ala., is the author of a treatise on lime putty.

As long as the supply lasts, copies will be mailed free to producers who request them on their letterheads.

SPEED UP PRODUCTION WITH THE HOLLOSTONE VIBRATING MACHINE



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The Hollostone products plant in North Hollywood in one week's time produces tile of value equal to the cost of the Hollostone machine. Write for complete information!

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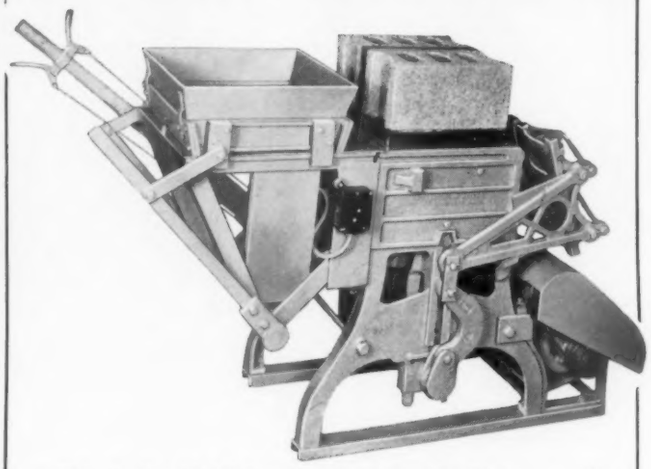
This Time Tested Unit Now Available *with Vibration*



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Makes plain and face block in all sizes from 3" to 12" in width, with press-top finish.

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Why Other Dealers Are Going Into "Ready Mixed":

Because the ready-mixed concrete business grew right thru the depression and has one of the brightest futures in America today.

Because there is a better profit in selling ready-mixed concrete than in selling bulk sand, stone and cement.

Because it keeps your men, trucks and equipment working profitably the year 'round.

Because it improves your service, brings you new customers, increases your volume on allied lines.

Because anyone who owns trucks needs but a small additional investment in loading plant and mixers — and it is very easy to expand facilities as needed.

Why Most Successful Plants Buy Jaeger Truck Mixers:

Because Jaeger Truck Mixers produce a higher strength, more workable concrete, proven by impartial, recorded tests.

Because so many engineers and contractors recognize this higher quality and prefer to buy from Jaeger operators.

Because Jaeger 2-speed mixing and faster charging and discharging mean faster trips, more payloads, bigger earnings per unit.

Because Man-Ten alloy steel, 3-point mounting, low center of gravity and correct load distribution make Jaeger maintenance amazingly low.

Because Jaeger operators reorder as they grow — some as often as 10 to 18 times.

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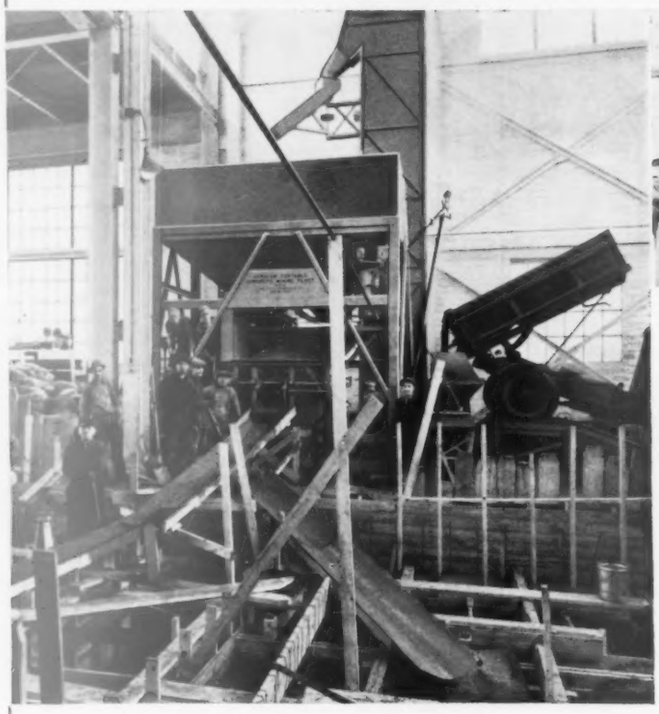
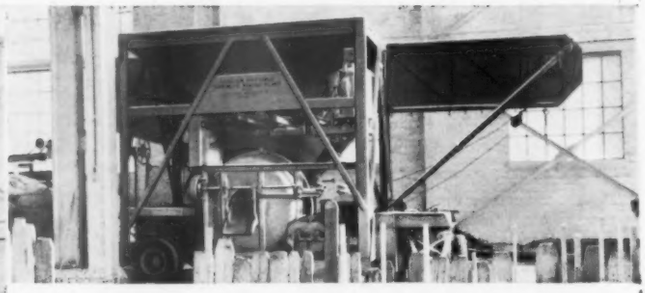
STRAYER PORTABLE CONCRETE PLANT





A complete portable storage, batching, and mixing plant, towed by truck. Fully equipped for any specification concrete. Capacity up to 32 cu. yds. per hour, depending on conditions.

In 20 minutes the plant was hauled 2 miles from the contractor's yard to the job as shown in small photo. In 58 minutes it was making concrete as shown in large photo.

It elevated 390 tons of material into bin, batched and mixed the concrete for a 235 yard pour in ten hours (which included time placing reinforcing, removing braces, etc.). The following morning the plant moved to another job.

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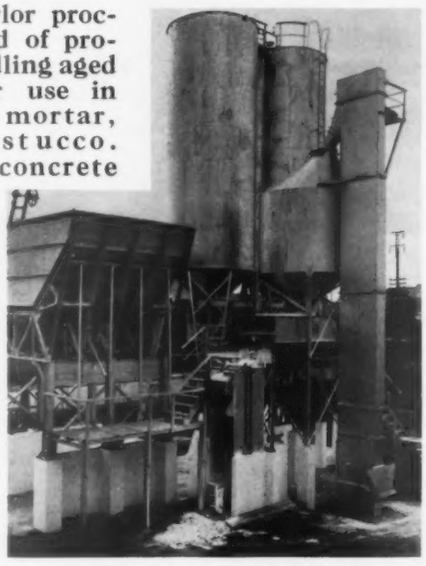

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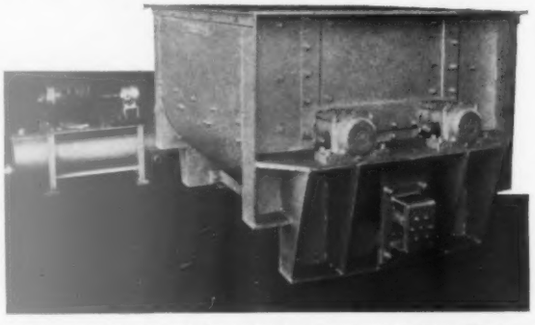

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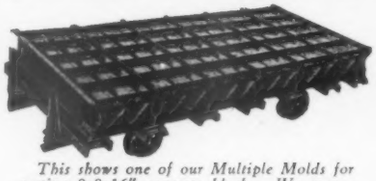

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1.4 Cu. Yds. Aggregate	$1.68
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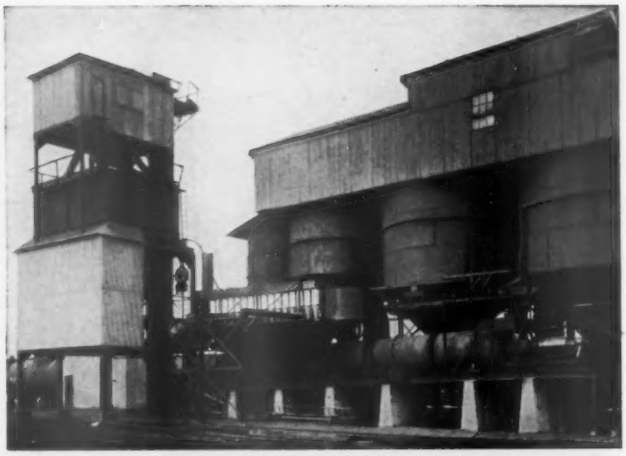

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BLAW-KNOX BLAW-KNOX DIVISION · OF BLAW-KNOX CO. · Farmers Bank Bldg. Pittsburgh, Pa.

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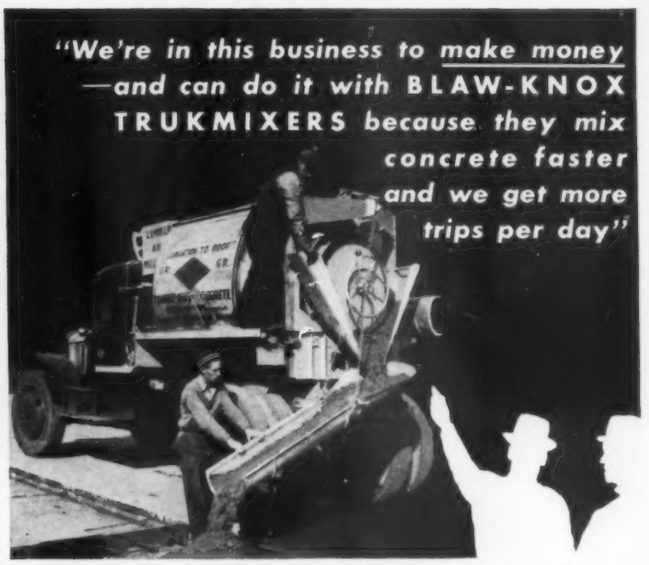
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It's a comfortable feeling to have truck mixers working for you that perform 100% under all conditions. No breakdowns — no worries.

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Here's No. 7

Operates exactly like the original Stearns Joltcrete No. 9—makes two 8x8x16" blocks per cycle, 3½ cycles per minute. It's hard to compete against Stearns Joltcrete blocks!

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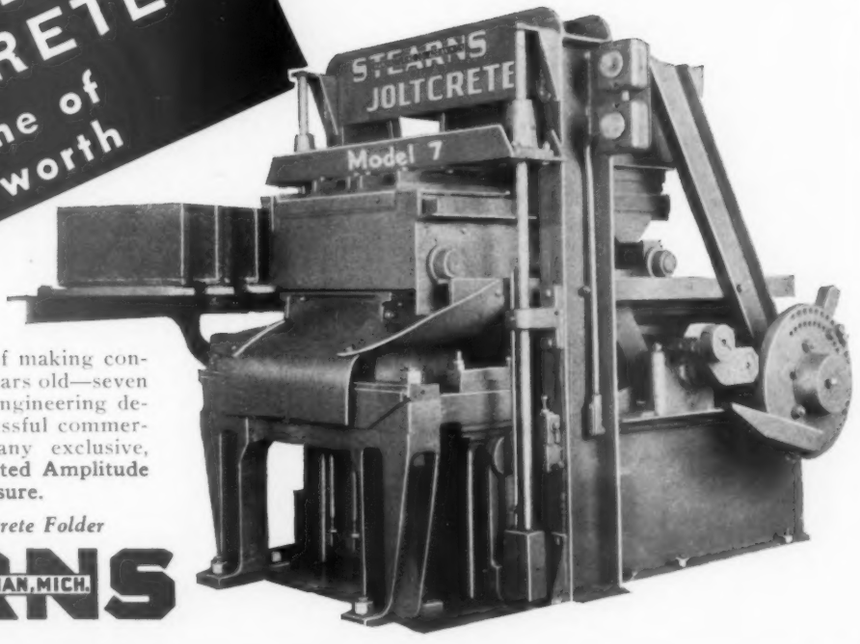

The Stearns Joltcrete method of making concrete units is not new. It's nine years old—seven years of careful experiment and engineering development and two years of successful commercial operation. It embodies many exclusive, patented features—including **Limited Amplitude Vibration—Vibration Under Pressure.**

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GENE OLSEN, PRESIDENT

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"SWINTEK" SCREEN NOZZLE LADDER

The nozzle head manufactured only under Eagle patents. It has no equal.

TAKES YOU OVER EVERY DREDGING HURDLE

Here . . . finally . . . is the one sure way to beat those tough dredging jobs that stop plain suction equipment. Use the Eagle "Swintek" Ladder to work deposits that do not readily cave or where oversize is a problem. Eagle equipment means *full time pumping* . . . no delays caused by clogged pipe lines, or slug pumping. Digging chain readily penetrates even cemented strata—screens out and removes oversize. Pumping depth limited only by depth of deposit. Many operators report their pump output multiplied several times due to continuous operation made possible by "Swintek." Reduce power, time and labor losses . . . install an Eagle "Swintek" Ladder and watch your profits climb!

EAGLE products include the famous EAGLE Sand and Gravel Washers, Spiral Screw Type and Paddle Log Type.

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HAUL
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Faster

● Half loads cost twice as much as full loads. You can haul *full capacity loads every trip, on and off the highway*, with these trucks that have live, pulling, pushing power and traction on all wheels. Greater safety on slippery roads. Write for literature and prices.

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TRY
"TWIN CITY ALLOY" WIRE
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NEXT TIME YOU NEED A REPLACEMENT

TWIN CITY IRON & WIRE CO.
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(Patented)

Special mixture of white iron, uniformly hard throughout. Held in place by neat portland cement, no bolts or wedges required. Shape retained during entire life in mill.

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PULVERIZING MILLS

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Check up on S-D Automatic Bottom Dumping Trailers. The trailer that gives you continuous operation . . . discharging and closing on the run, with no auxiliarly powered mechanisms. Built for heavy service and easy, fast manipulation. Here's the trailer for stripping hauling and dumping costs to rock bottom. Let an S-D engineer tell you why.

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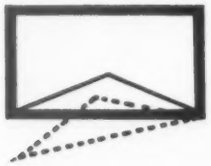
NOW PRECISION DUMPING WITH DEMPSTER DUMPSTER

"THE *DROP* BOTTOM BUCKET"

No Overhang
No Sidesway
No Counterweight



Here is a feature that is selling more and more Dempster Dumpsters throughout the country—New York to New Mexico, Oklahoma to Canada—for government and private construction: Detachable Buckets with the Drop Bottom Discharge insure faster dumping and accurate spotting of the load—more trips per day and lower cost of hand loading.

New Model 200-LF Dempster Dumpster on any 1½-ton truck, hauling 2 cu. yds. in a Drop Bottom Bucket, will save 40% to 50% on any hand loading job. You can use smaller trucks and serve a larger crew of loaders with Dempster Dumpster ***one-man control*** units.

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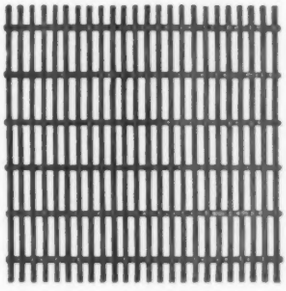

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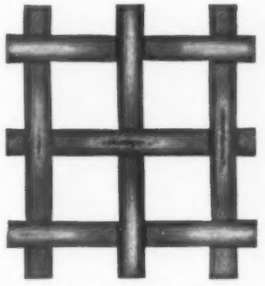
A super wearing Steel developed to resist the abrasion and vibration of modern screening demands.

"CLEVELAND" SCREENS

A wire cloth of **guaranteed accuracy** backed by fine workmanship and an **effort to satisfy.**

Available in Square **Mesh and** Rolled Slot. A trial will convince you of the superiority.



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CRUSHERS DRY PANS

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Made with manganese roll shells easily removed from cast iron adjustable roll cores. Crusher equipped with roller bearings. Power applied to both shafts.

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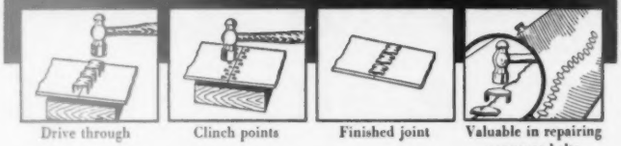
BELT JOINING MADE EASY!



Drive through | Clinch points | Finished joint | Valuable in repairing conveyor belts

All you need to make quick joints on your belts or conveyors are a hammer, a block of soft wood,—and Bristol's Steel Belt Lacing. No need for special tools or experienced lacers. No need for costly shut-downs. Bristol's are available in sizes and styles for smooth, durable, lock-tight joints on any belt material and thickness from lightest split leather to ten ply stock. Full details in Bulletin No. 725. Write for it. THE BRISTOL COMPANY, Mill Supply Division, WATERBURY, CONN. Branches in Principal Cities.

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TRADE MARK REG. U.S. PAT. OFF.

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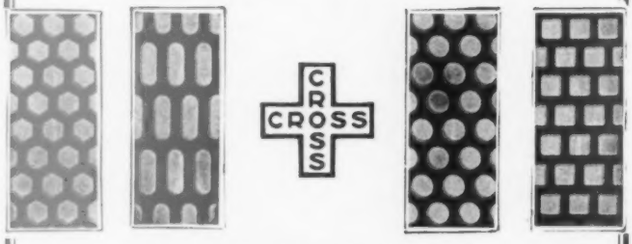

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High efficiency—low operating cost—precision workmanship—wear-resisting, non-heating bearings even when operated under extremely high heads. WRITE

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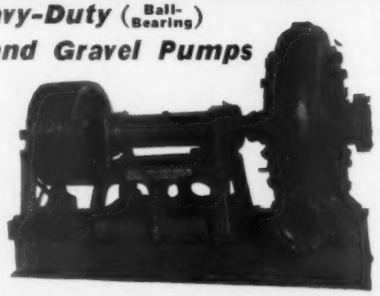
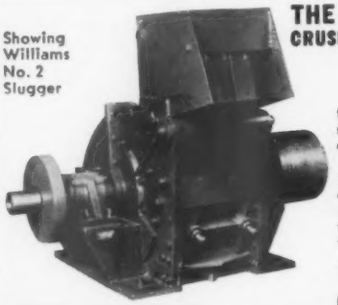


Showing Williams No. 2 Slugger



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CRUSHER *for* MAKING 1¼", ¾" OR AGSTONE
HANDLES LARGE STONE

Rows of heavy, free swinging, fast revolving hammers, crush the material by impact until of proper size to pass through the grates. By reducing large rock to 1¼", ¾" or agricultural size in one operation, the "Slugger" has enabled operators to produce these sizes at a very low cost per ton and with small investment.

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Much More Economical To Own and Operate Than Cloth Machines

Very Efficient on All Types of Dust

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McLanahan Equipment

Single and double roll and jaw crushers, hammer mills, super dry pans,—steel log washers and scrubbers, sand drags, revolving and vibrating screens, elevators, conveyors, dryers, jigs, hoists,—complete portable, semi-portable and stationary crushing, screening and washing plants for different capacities of any materials.

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Continuously in Business Since 1835
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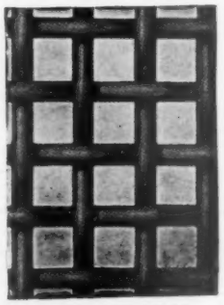
of Nat-aloy Wire Cloth



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- ★ Super-tough to resist abrasion
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Immediate Shipments from Stock

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Supplies BOTH!

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This is only ONE of several recent installations that clearly demonstrate the superiority and popularity of Kuntz designs. Write for Information.

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$17.50 PER SET

CAN BE QUICKLY ATTACHED TO YOUR OWN GRINDING EQUIPMENT

ROCK BITS KEPT SHARP

and drilling goes faster with a Pacific grinding attachment . . . Simple, convenient, practical . . . Any handy man can use it. . . .

No special form wheels needed . . . Designed for standard wheels easily obtained from your nearby dealer.

The parts comprising this attachment are shown in lighter areas in above illustration. When desired, we can supply the complete unit including wheel, electric motor, etc.

When ordering specify MAKE AND THREAD SIZE of bit to be ground.

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PACIFIC *Detachable Drill Bit* **GRINDER**

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1862 E. 55TH STREET • LOS ANGELES, CALIF., U. S. A.
Manufacturers of Pacific Jaw Crushers · Pacific Bit Grinders
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Would 300 to 400% SAVINGS in Hauling & Dumping Interest YOU ?

Imposing figures, aren't they? These are the actual savings made by the Brooks Load-Lugger on many hand loading operations . . . cost cutting news for any man's pocketbook! You, too, should profit from the Lugger's continuous operation . . . save on its curtailing of investment in needless trucks. For the Brooks Load-Lugger and 4 to 8 buckets may replace several trucks . . . operate at a faster speed than any other equipment used on hand loading operations. Send for the economy story today! Demonstrations arranged in most sections.

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Big Savings
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Sauerman Cableway lifts gravel from deep under water to top of plant.

WHEREVER there is a problem of excavating sand and gravel, stripping overburden, stockpiling bulk materials or other work involving hauls of several hundred feet, it pays to find out what a Sauerman Slackline Cableway or Drag Scraper will do and what it will cost.

In most cases a Sauerman machine shows a saving in comparison with any other equipment that will dig and haul an equal yardage.

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Digging bank gravel is easy one-man job with Sauerman Drag Scraper.

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SMITH-MOBILE

THE *Modern* TRUCK MIXER and AGITATOR

Gives You **MORE LOADS PER DAY**

Here's Why . . .

FASTER CHARGING—Large roomy charging chute makes it easy to spot mixer under bin gates. No troublesome, leaky hatch to open or close. Enables driver to stay in cab. Water introduced through feed opening. No clogged water bells buried in concrete.

FASTER AND BETTER MIXING—for high or even no slump concrete. Shrinking and mixing starts the instant the batch enters drum, because *drum rotates during the charging operation.* Scientific blade design produces positive "end-to-end" movement of aggregates. Sealing door can be opened wide during mixing cycle. You can look in drum and actually SEE what's going on.

FASTER DISCHARGE—Spiral mixing vanes convey concrete to discharge opening in a smooth, even flow. High discharge permits steeper and longer distributing spout. Covers greater area even with dry concrete. *No hoist or ramp required.* Distributing spout carried on pivot bracket while in transit as well as when pouring.

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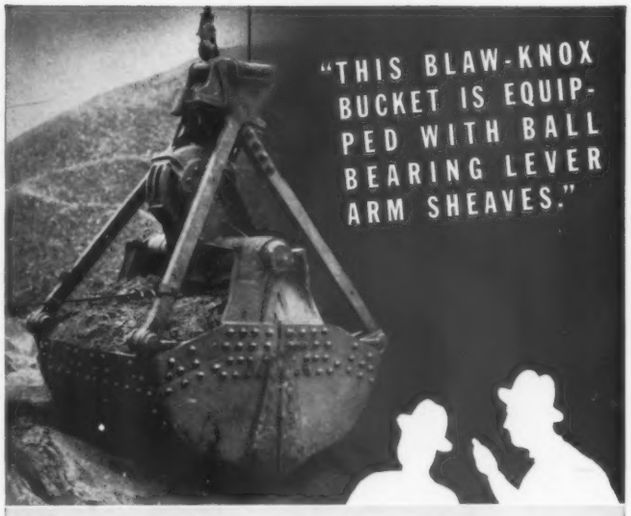
Built and Guaranteed by SMITH — Mixer Manufacturers since 1900



As a matter of fact this feature is standard equipment and does not cost more. It is especially desirable where the bucket handles loose granular materials because it keeps lubrication in and dirt out. This and many other desirable features of Blaw-Knox Buckets is fully described and illustrated in Bulletin No. 1606. Write for it today.

17

BLAW-KNOX *Digging and Rehandling* **BUCKETS**

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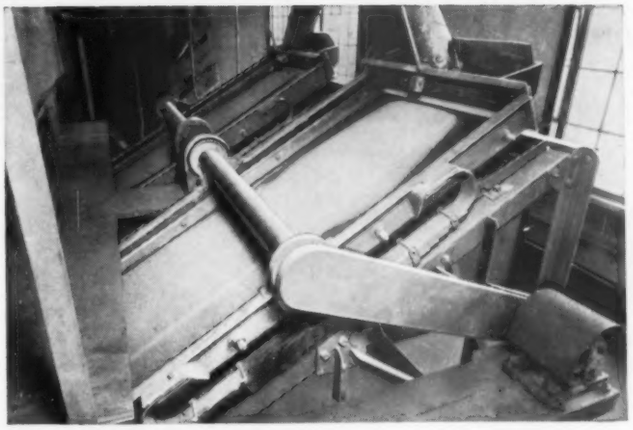
VIBRATING SCREENS by LINK-BELT



Made in several types, for screening sand, gravel, crushed stone, coal, coke, clay, lime, fertilizer, ores, grain, sugar, chemicals, pulpwood chips, etc. Send for Catalog No. 1562. Address Link-Belt Company, Philadelphia, Chicago, Indianapolis, Atlanta, San Francisco, or any of our offices, located in principal cities.

P-7120

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Four-segment Pyrasteel Kiln End, shown below

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Kiln Ends cut fuel costs by tight sealing

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Feed Pipe last longer, cost less in service

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Drag Chains for heavy duty

EVANSTEEL or PYRASTEEL
One-Piece Screw Conveyors

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Makers of Alloy Steel for over 25 Years

(Trade-marks of PYRA. and EVAN.)

Ask for KILN BULLETIN

PYRASTEEL for high temperatures

EVANSTEEL for strength

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A Directory of Pit and Quarry Advertisers Indexed According to Product.

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Bulk-Cement Storage Plants
*Chicago Bridge & Iron Co.
Heltzel Steel Form & Iron Co.
McCarter Iron Works, Inc., The
Sprout, Waldron & Co.

Bulldozers
*Le Tourneau, Inc., R. G.

Cable (Electric)
*General Electric Co.

Cableways
Bethlehem Steel Co.
Gilmore Wire Rope Div. of Jones & Laughlin Steel Corp.
Leschen & Sons Rope Co., A.
*Roebling's Sons Co., John A.
*Sauerman Bros., inc.

Capacitors
*General Electric Co.

Caps (Blasting)
Atlas Powder Co.
E. I. Dupont De Nemours & Co.
National Powder Co.

Caps (Blasting, Electric)
Atlas Powder Co.
National Powder Co.

Capstans (See Winches and Capstans)

Car Control Systems
*General Electric Co.

Car Dumpers
*Link-Belt Co.
Wellman Engineering Co.

Car Pullers
Gilmore Wire Rope Div. of Jones & Laughlin Steel Corp.
*Link-Belt Co.

Car Wheels — (See Wheels — Car)

Carriers
*Link-Belt Co.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.

Carryalls
*Koehring Co.
*Le Tourneau, Inc., R. G.

Cars (Block, Concrete)
*Link Belt Co.
*Multiplex Concrete Machinery Co.

Cars (Industrial)
*Easton Car & Construction Co.

Cars (Quarry & Gravel Pit)
Sanford-Day Iron Works

Castings
Alloy Steel & Metals Co.
Chain Belt Co.
Chicago Steel Fdry. Co.
*Eagle Iron Works
Frog, Switch & Mfg. Co.
*Hardinge Co.
Hetherington & Berner, Inc.
*Link-Belt Co.
McLanahan & Stone Corp.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Cement Pumps (See Pumps; Air Pumps; Pumps, Cement Slurry; Pumps, Bulk Cement)

Central Concrete Mixing Plants (Comp.)
*Erie Steel Construction Co.
Heltzel Steel Form & Iron Co.
*Jaeger Machine Co.
McCarter Iron Works, Inc., The
Sprout, Waldron & Co.

Chain Attachments
Chain Belt Co.

Chain (Dredge and Shovel)
Manganese Steel Forge Co.

Chain Drives
Chain Belt Co.
*Link-Belt Co.

Chain (Elevating and Conveying)
Chain Belt Co.
Cross Engineering Co.
*Haiss Mfg. Co., Geo.
*Link-Belt Co.
Manganese Steel Forge Co.
Sprout, Waldron & Co.

Chutes and Chute Liners
Chain Belt Co.
Cross Engineering Co.
Frog, Switch & Mfg. Co.
*Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.
McCarter Iron Works, Inc., The
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
*Smidth & Co., F. L.
Sprout, Waldron & Co.

Chute Lining (Rubber)
Manhattan Rubber Mfg. Division

Circuit Breakers and Testers
*General Electric Co.

Classifiers
*Deister Machine Co.
Hardinge Co.
Lewistown Foundry & Machine Co.
*Link-Belt Co.
*Nordberg Mfg. Co.
Simplicity Engr. Co.
Straub Mfg. Co.

Clips (Wire Rope)
Bethlehem Steel Co.
Gilmore Wire Rope Div. of Jones & Laughlin Steel Corp.
Leschen & Sons Rope Co., A.
*Roebling's Sons Co., John A.

Clutches
*Link-Belt Co.
Sprout, Waldron & Co.

* See also information in the 1939 Pit and Quarry HANDBOOK.

ASPHALT PLANTS

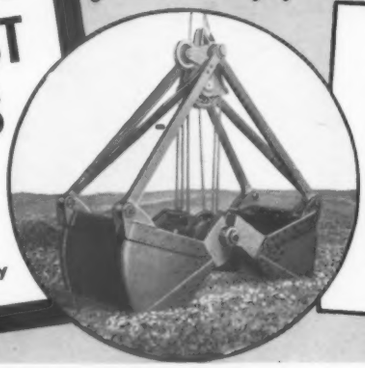
HOT & COLD MIX—ANY CAPACITY
PORTABLE OR STATIONARY
STEAM — ELECTRIC OR DIESEL

THE SIMPLICITY SYSTEM COMPANY
CHATTANOOGA, TENNESSEE

INDUSTRIAL BROWNHOIST BUCKETS

for Bigger Output at Lower Costs

ROPE-REEVE
POWER-WHEEL
LEVER-ARM
LINK-TYPE
½ to 15 Yards Capacity



The value of our forty years experience in building better buckets is best demonstrated by the enthusiastic comments of their owners. Here is one recently received. "We are handling more coal with our new Industrial Brownhoist 1¼-yard Clamshell than we ever did with our old 2-yard bucket."

Because the new Industrial Brownhoist buckets are designed to meet today's materials handling problems, increased production and profits invariably result wherever they are used.

Get the complete facts from Booklet 353. Send for a copy.

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Since 1907 Sterling has been building chain drive motor trucks for every type of hauling requirement. Today's cost sheets tell the story. Sterling chain drives are more economical. Whether your haul is long or short, on or off the highway, there is a Sterling built for your specific requirements.

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STERLING MOTORS CORPORATION
MILWAUKEE, WIS.
Factory Branches in Principal Cities

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moving out faster with the aid of

GARDNER-DENVER SINKERS

● Don't let rock work drag down your profits! Get that rock out faster—and at lower cost—with Gardner-Denver Sinkers! They have the speed you need for quick drilling. They have the *dependability* required for uninterrupted, trouble-free operation. They are easy to handle . . . promote efficient work. They are low in air consumption. There is a Gardner-Denver Sinking Drill for every sinking job . . . a complete line of Gardner-Denver models, each with a field-proved record of performance. Let us give you the facts—write today for bulletins! Gardner-Denver Company, Quincy, Illinois.

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Model S-45—Weighs 44 lbs.—especially useful where ground is medium, badly broken or uneven.

Model S-55—A 55-lb. drill that's the champion in its class—big drilling capacity with easy riding and conservative air consumption.

Model S-79—A big drill for big performance—yet easily handled. Especially good for drilling in extremely hard formations.

GARDNER-DENVER

80th ANNIVERSARY YEAR

BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

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Coal-Pulverizing Equipment
*Hardinge Co.
*Raymond Pulverizer Division of the Combustion Engineering Co.
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.
*Williams Patent Crusher & Pulverizer Co.

Compressors (See Air Compressors)

Concentrators (Slurry)
*Deister Concentrator Co.

Concrete Breakers (Air)
Gardner-Denver Co.

Concrete Mixers
*Blaw-Knox Co.
Chain Belt Co.
*Erie Steel Construction Co.
*Jaeger Machine Co.
*Koehring Co.
*Smith Co., T. L.

Concrete Products Plant Equipment
*Universal Concrete Pipe Co.

Concrete Slab Raising Equipment (Mud Jacks)
*Koehring Co.

Cones (Sand-Washing)
*Chicago Bridge & Iron Co.
*Link-Belt Co.
Smith Engr. Works

Controllers (Electric)
*General Electric Co.

Converters (Electric)
*General Electric Co.

Conveyor Belting
*Haiss Mfg. Co., Geo.
*Link-Belt Co.
Quaker City Rubber Co.
Republic Rubber Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Conveyor Idlers and Rolls
Chain Belt Co.
*Diamond Iron Works
*Haiss Mfg. Co., Geo.
*Link-Belt Co.
*Robins Conveying Belt Co.

Conveyors and Elevators
Bacon, Inc., Earle C.
Chain Belt Co.
Chicago Steel Fdry. Co.
Cross Engineering Co.
*Diamond Iron Works
*Fuller Company
Gilmore Wire Rope Div. of Jones & Laughlin Steel Corp.
*Gruendler Crusher & Pulverizer Co.
*Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Industrial Brownhoist Corp.
Lewistown Foundry & Machine Co.
*Link-Belt Co.
McLanahan & Stone Corp.
New Holland Machine Co.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.
Straub Mfg. Co.

Conveyors (Pneumatic)
*Fuller Company

Conveyors (Ready-Mixed Concrete)
*Blaw-Knox Co.
Chain Belt Co.
*Haiss Mfg. Co., Geo.
*Jaeger Machine Co.
*Link-Belt Co.
Ransome Concrete Machy. Co.
*Robins Conveying Belt Co.

Coolers (Clinker)
*Fuller Co.
Link-Belt Co.
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.

Coolers (See Kilns and Coolers—Rotary)

Correcting Basins
*Smidth & Co., F. L.

Couplings (Flexible and Shaft)
*Link-Belt Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Cranes (Crawler and Locomotive)
*Bay City Shovels, Inc.
*Bucyrus-Erie Co.
Industrial Brownhoist Corp.
*Koehring Co.
*Lima Locomotive Works
*Link-Belt Co.
Marion Steam Shovel Co.
Northwest Engineering Co.
Thew Shovel Co.

Cranes (Electric Traveling)
*Erie Steel Construction Co.
Industrial Brownhoist Corp.

Cranes (Overhead)
*Erie Steel Construction Co.
Industrial Brownhoist Corp.

Crusher Parts
Alloy Steel & Metals Co.
*American Pulverizer Co.
Frog, Switch & Mfg. Co.
McLanahan and Stone Corp.
*Traylor Engr. & Mfg. Co.

Crushers (Cone)
*Nordberg Mfg. Co.

Crushers (Hammer)
*American Pulverizer Co.
*Brooks Equip. & Mfg. Co.
*Dixie Machinery Mfg. Co.
*Gruendler Crusher & Pulverizer Co.
Lime & Hydrate Plants Co.
Straub Mfg. Co.
*Williams Patent Crusher & Pulverizer Co.

Crushers (Jaw and Gyratory)
Alloy Steel & Metals Co.
Bacon, Inc., Earle C.
Brooks Equip. & Mfg. Co.
*Diamond Iron Works
*Gruendler Crusher & Pulverizer Co.
Lewistown Foundry & Machine Co.
New Holland Machine Co.
*Nordberg Mfg. Co.
Smith Engr. Works
Straub Mfg. Co.
*Traylor Engr. & Mfg. Co.

Crushers (Ring)
*American Pulverizer Co.
*Williams Patent Crusher & Pulverizer Co.

Crushers (Roll)
*American Pulverizer Co.
*Brooks Equip. & Mfg. Co.
*Diamond Iron Works
*Gruendler Crusher & Pulverizer Co.
*Link-Belt Co.
McLanahan and Stone Corp.
New Holland Machine Co.
*Robins Conveying Belt Co.
Straub Mfg. Co.
*Williams Patent Crusher & Pulverizer Co.

Crushers (Rotary)
*American Pulverizer Co.
New Holland Machine Co.
*Williams Patent Crusher & Pulverizer Co.

Crushing Rolls
Alloy Steel & Metals Co.
Frog, Switch & Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
New Holland Machine Co.
Straub Mfg. Co.
*Traylor Engr. & Mfg. Co.
*Williams Patent Crusher & Pulverizer Co.

Cutter Heads (Dredging)
*Eagle Iron Works

Detonators
Atlas Powder Co.
E. I. DuPont De Nemours & Co.
National Powder Co.

* See also information in the 1939 Pit and Quarry HANDBOOK.

Diaphragms (Rubber)
Quaker City Rubber Co.

Diesel Engines (See Engines—Diesel)

Dipper Parts
Frog, Switch & Mfg. Co.

Dippers and Teeth (Power Shovel)
*Bucyrus-Erie Co.
Frog, Switch & Mfg. Co.
*Koehring Co.

Dragline Cableway Excavators
*Bucyrus-Erie Co.
*Link-Belt Co.
*Sauerman Bros., Inc.

Dragline Excavators
*Bay City Shovels, Inc.
*Bucyrus-Erie Co.
*Erie Steel Construction Co.
Industrial Brownhoist Corp.
*Koehring Co.
*Lima Locomotive Works
*Link-Belt Co.
Marion Steam Shovel Co.
Northwest Engineering Co.
Thew Shovel Co.

Draglines (Walking)
*Bucyrus-Monighan Co.

Dredges
*Bucyrus-Erie Co.
Hetherington & Berner, Inc.
*Morris Machine Works

Driers
*Chicago Bridge & Iron Co.
*Hardinge Co.
Lewistown Fdry. & Machine
Lime & Hydrate Plants Co.
*Link-Belt Co.
McCarter Iron Works, Inc., The
McLanahan & Stone Corp.
*Traylor Eng. & Mfg. Corp.
Tyler Co., W. S.

Drill Bit Reconditioning
*Bucyrus-Erie Co.

Drill Sharpening Machinery
Gardner-Denver Co.

Drilling Accessories
*Bucyrus-Erie Co.
Gardner-Denver Co.

Drilling Contractors
Hoffman Bros. Drilling Co.
Pennsylvania Drilling Co.

Drills (Blast-Hole)
*Bucyrus-Erie Co.
Gardner-Denver Co.

Drills (Core)
Hoffman Bros. Drilling Co.
Pennsylvania Drilling Co.

Drills (Diamond)
Hoffman Bros. Drilling Co.
Pennsylvania Drilling Co.

Drills (Drifting)
Gardner-Denver Co.

Drills (Hand Hammer)
Gardner-Denver Co.

Drills (Rock)
Gardner-Denver Co.

Drills (Sinking)
Gardner-Denver Co.

Drills (Stoping)
Gardner-Denver Co.

Drills (Wagon)
*Bucyrus-Erie Co.
Gardner-Denver Co.

Drills (Water Well)
*Bucyrus-Erie Co.

Drills (Well) (See Drills—Blast-Hole)

Drives (Multiple Belt, Chain, Rope)
Chain Belt Co.
*Link-Belt Co.

Dust Arresters
*Blaw-Knox Co.
Clark Dust Control Co.
*Research Corp.
*Sly Mfg. Co., W. W.
*Western Precipitation Corp.

Dust Collecting Systems
*Blaw-Knox Co.
Clark Dust Control Co.
McCarter Iron Works, Inc., The
*Raymond Pulverizer Division of the Combustion Engineering Co.
*Research Corp.
*Sly Mfg. Co., W. W.
*Western Precipitation Corp.

Dust Conveying Systems
Allen-Sherman-Hoff Co.
*Blaw-Knox Co.
Clark Dust Control Co.
*Fuller Company
*Research Corp.
*Sly Mfg. Co., W. W.
*Western Precipitation Corp.

Dust Filters
Clark Dust Control Co.
*Research Corp.
*Sly Mfg. Co., W. W.
*Western Precipitation Corp.

Dynamite (See Explosives)

Dynamos
*General Electric Co.

Electric Cables (See Cables—Electric)

Electrical Equipment
*General Electric Co.

Electrodes (Welding)
Stulz-Sickles Co.
Wall-Colmonoy Corp.

Elevator Belting (See Belting)

Elevator Buckets (See Buckets—Elevator and Conveyor)

Elevators (See Conveyors and Elevators)

Eliminators (Soft Stone) (See Soft Stone Eliminators)

Engineers
Bacon, Inc., Earle C.
Cross Engineering Co.
*Fuller Company
Hetherington & Berner, Inc.
Lime & Hydrate Plants Co.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
*Smidth & Co., F. L.
Sprout, Waldron & Co.
*Traylor Engr. & Mfg. Co.
Wellman Engineering Co.

Engine Generator Sets See Generator Sets (Engine).

Engines (Diesel)
Caterpillar Tractor Co.
Cummins Engine Co.
National Supply Co. of Del.
*Nordberg Mfg. Co.
Superior Diesel Engine Division of the National Supply Co.

Engines (Internal-Combustion)
Caterpillar Tractor Co.
Cummins Engine Co.
National Supply Co. of Del.
*Nordberg Mfg. Co.
Superior Diesel Engine Division of the National Supply Co.

Engines (Steam)
*Morris Machine Works
*Nordberg Mfg. Co.

Excavating Machinery (See Shovels; Cranes; Buckets, etc.)

Excavators—Shallow Grading (Bucket Elevator Type)
*Haiss Mfg. Co., Geo.

Explosives
Atlas Powder Co.
E. I. DuPont De Nemours & Co.
National Powder Co.

Fabricating (Electric Arc and Oxy-Acetylene)
Stulz-Sickles Co.

Fans
*General Electric Co.

Feeders
Chain Belt Co.
*Diamond Iron Works
*Fuller Company
*Hardinge Co.
*Link-Belt Co.
McCarter Iron Works, Inc., The
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.
Straub Mfg. Co.
*Traylor Engr. & Mfg. Co.

Forges (Oil)
Gardner-Denver Co.

Furnaces (Heat Treating, Electric)
*General Electric Co.

Fuse Cutouts
*General Electric Co.

Fuses (Detonating)
Atlas Powder Co.
*Ensign-Bickford Co.
E. I. DuPont De Nemours & Co.
National Powder Co.

Fuses (Electrical)
*General Electric Co.

Gas Producers
Wellman Engineering Co.

Gaskets
Quaker City Rubber Co.
Republic Rubber Co.

Gasoline Engines (See Engines—Internal-Combustion)

Gates (Bin) (See Bin Gates)

Gates (Clamshell)
*Haiss Mfg. Co., Geo.
*Link-Belt Co.

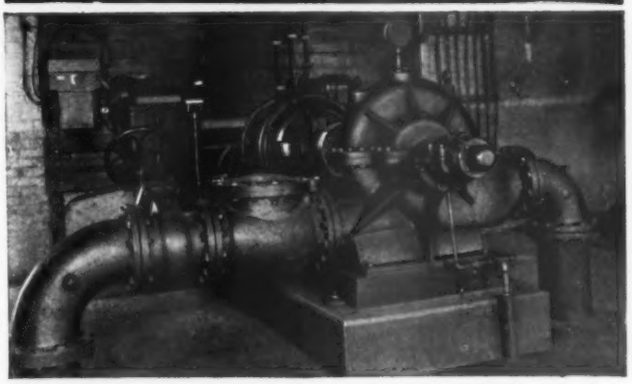
Gear Motors
*General Electric Co.

Gears (Herringbone)
Chain Belt Co.
*General Electric Co.
*Link-Belt Co.
Sprout, Waldron & Co.

* See also information in the 1939 Pit and Quarry HANDBOOK.

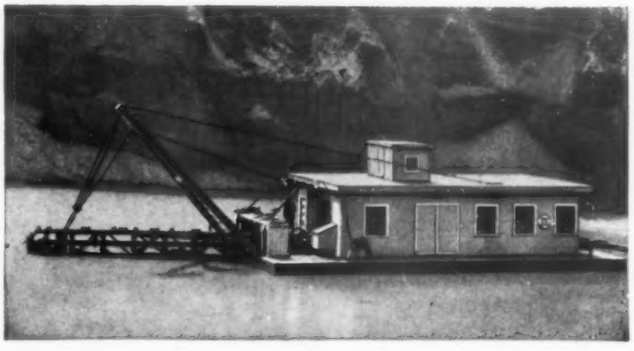
The MORRIS HYDRAULIC COLUMN

News of interest to Centrifugal Pump Users



50% more capacity with the same power! . . . .

A southern plant needed more pumping capacity. The engineer came to Morris for advice. The result . . . a single stage Morris Pump which gave them 50% more water at the same head as from the old two-stage pump, *using the same motor as before.* If you need more capacity, or if your pumping costs are high, investigate Morris designs for your requirements. Seventy-four years of centrifugal pump-building experience makes Morris recommendations authoritative.



Confounding the skeptics . . . .

The favorite job of the Morris engineers is to prove how often the "impossible" is possible in pumping operations. Many are the instances in which Morris Pumps are developing "impossible" efficiencies, handling "impossible" mixtures, operating under "impossible" conditions, and lasting "impossibly" long. Morris Dredges, too, are successfully solving problems of sand and gravel production which have stumped previous attempts at solution. If you have a difficult pumping or dredging problem, don't give it up, give it to the Morris engineers. They'll give you the answer.

MEMBER

For authoritative recommendations on any pumping or dredging problem, write to Morris Machine Works, Baldwinsville, N. Y. Representatives in Principal Cities.

BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

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Gears and Pinions
Chain Belt Co.
*General Electric Co.
*Haiss Mfg. Co., Geo.
*Link-Belt Co.
Sprout, Waldron & Co.

Gelatin (See Explosives)

Generator Sets (Engine)
*General Electric Co.
National Supply Co. of Del.
Superior Diesel Engine Division of the National Supply Co.

Generator Sets (Motor)
*General Electric Co.

Generator Sets (Turbine)
*General Electric Co.

Generators (See Motors and Generators)

Generators (Electric)
*General Electric Co.

Glass Sand Equipment
Lewistown Foundry & Machine Co.

Grab Buckets (See Buckets—Clamshell, Orange - Peel, etc.)

Grapples
*Erie Steel Construction Co.
Owen Bucket Co.

Grating (Steel)
*Blaw-Knox Co.
*Hendrick Mfg. Co.

Grinding Balls (See Balls, Grinding)

Grizzly Feeders
*Link-Belt Co.
*Traylor Engr. & Mfg. Co.

Grizzlies
*Eagle Iron Works
*Hendrick Mfg. Co.
Lewistown Fdry. & Mach. Co.
*Link-Belt Co.
Manganese Steel Forge Co.
*Robins Conveying Belt Co.
Smith Engr. Works

Guards (Wire)
Manganese Steel Forge Co.
*National Wire Cloth Co.

Guns (Hydraulic)
Hetherington & Berner, Inc.
Taylor Forge & Pipe Works

Hammer Mills (See Crushers—Hammer)

Hard Facing Metals
Wall-Colmonoy Corp.

Haulage Systems (Electric)
*General Electric Co.

Heaters (Bitumen)
*Easton Car & Construction Co.
McCarter Iron Works, Inc., The

Hitchings (Links, Pins, Clevises)
Sanford-Day Iron Works

Hoists
Commercial Shearing & Stamping Co.
Gardner-Denver Co.
Hetherington & Berner, Inc.
Industrial Brownhoist Corp.
*Jaeger Machine Co.
McLanahan and Stone Corp.
*Sauerman Bros., Inc.
Smith Engr. Works
Sprout, Waldron & Co.

Hoppers
*Chicago Bridge & Iron Co.
*Hendrick Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.
McCarter Iron Works, Inc., The

Hose (Air, Steam and Water)
Manhattan Rubber Mfg. Division
Quaker City Rubber Co.
Republic Rubber Co.

Hose (Fire and Suction)
Quaker City Rubber Co.

Hose (Radiator-Engine Cooling)
Quaker City Rubber Co.

Hose Couplings (See Couplings)

Hose (Radiator-Engine Cooling)
Republic Rubber Co.

Hydrate Plants (Complete)
Lime & Hydrate Plants Co.

Hydrators
Lime & Hydrate Plants Co.

Hydraulic Guns (See Guns—Hydraulic)

Idlers
Chain Belt Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.

Indicators (Material Level)
*Fuller Company

Indicators (Recording Instruments)
Bristol Co.

Instruments (Electrical)
*General Electric Co.

Insulation (Electric)
*General Electric Co.

Kilns and Coolers (Rotary)
*Chicago Bridge & Iron Co.
*Hardinge Co.
Lime & Hydrate Plants Co.
*Link-Belt Co.
McCarter Iron Works, Inc., The
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.

Kilns (Vertical)
*Chicago Bridge & Iron Co.
*Hardinge Co.
Lime & Hydrate Plants Co.

Kominuters
*Smidth & Co., F. L.

Ladders (Agitating Dredge)
*Eagle Iron Works

Ladders (Hydraulic Dredge)
*Eagle Iron Works

Lighting
*General Electric Co.

Lights (Flood)
*General Electric Co.

Lime & Hydrating Plants
*Chicago Bridge & Iron Co.
*Hardinge Co.
Lime & Hydrate Plants Co.

Lime-Handling Equipment
*Chicago Bridge & Iron Co.
*Fuller Company
*Hardinge Co.
*Link-Belt Co.
*Raymond Pulverizer Division of the Combustion Engineering Co.
*Robins Conveying Belt Co.
*Traylor Engr. & Mfg. Co.

Lime Plants (Complete)
*Hardinge Co.
Lime & Hydrate Plants Co.

Lime Kilns
*Chicago Bridge & Iron Co.
*Hardinge Co.
Lime & Hydrate Plants Co.

Lime Putty Plants
*Chicago Bridge & Iron Co.

Linings (Ball- and Tube-Mill) (See Mill Liners and Linings)

Loaders and Unloaders
*Bucyrus-Erie Co.
Chain Belt Co.
*Fuller Company
*Haiss Mfg. Co., Geo.
*Link-Belt Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Locomotives (Diesel)
Davenport Locomotive Works

Locomotives (Diesel-Electric)
Davenport Locomotive Works
*General Electric Co.

Locomotives (Electric, Gas & Steam
Davenport Locomotive Works
*General Electric Co.

Locomotives (Gas-Electric)
Davenport Locomotive Works
*General Electric Co.

Locomotives (Oil Electric)
Davenport Locomotive Works
*General Electric Co.

Locomotives (Storage Battery)
Davenport Locomotive Works
*General Electric Co.

Locomotives (Trolley Battery)
Davenport Locomotive Works
*General Electric Co.

Machinery Wearing Parts
Alloy Steel & Metals Co.

Magnetic Pulleys (See Pulleys, Magnetic)

Magnets
*General Electric Co.

Manganese Steel
Alloy Steel & Metals Co.
Frog, Switch & Mfg. Co.
Manganese Steel Forge Co.

Manganese Steel (Plates and Sheets)
Alloy Steel & Metals Co.
Manganese Steel Forge Co.

Manganese Steel Castings
Alloy Steel & Metals Co.
Frog, Switch & Mfg. Co.

Measuring Devices (Electric)
*General Electric Co.

Mechanical Rubber Goods
Manhattan Rubber Mfg. Division
Quaker City Rubber Co.
Republic Rubber Co.

Meters
*General Electric Co.

Mill Liners and Linings
Alloy Steel & Metals Co.
*Hardinge Co.
*Smidth & Co., F. L.
*Traylor Engr. & Mfg. Co.

Mills (Ball, Tube, etc.)
*Hardinge Co.
*Traylor Engr. & Mfg. Co.

Mills (Grinding) (See also Crushers—Hammer)
*American Pulverizer Co.
*Brooks Equip. & Mfg. Co.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdry. & Mach. Co.
*Raymond Pulverizer Division of the Combustion Engineering Co.
*Smidth & Co., F. L.
Sprout, Waldron & Co.
Straub Mfg. Co.
*Traylor Engr. & Mfg. Co.
*Williams Patent Crusher & Pulverizer Co.

Mills (Pug)
McCarter Iron Works, Inc., The

Minerals Separation (Cement) (See Cement Minerals Separation)

Mixers (Asphalt)
Hetherington & Berner, Inc.
*Link-Belt Co.
McCarter Iron Works, Inc., The
Simplicity System Co.
*Warren Bros. Roads Co.

Mixers (Concrete)
Anchor Concrete Machy. Co.
*Kent Machine Co.
*Link-Belt Co.
*Multiplex Concrete Machinery Co.
*Stearns Mfg. Co.
Zagelmeyer Cast Stone Block Machy. Co.

Motor Control
*General Electric Co.

Motor Trucks
Ford Motor Co.
Hug Co., The
Marmon-Herrington Co.
Sterling Motor Truck Co.

Motors (Electric)
*General Electric Co.

Motors and Generators
*General Electric Co.

Motors (Internal-Combustion) (See Engines — Internal-Combustion)

Moulds and Forms (Concrete)
Anchor Concrete Machy. Co.
Dunn Mfg. Co., W. E.
Hollostone Co.
*Kent Machine Co.
*Multiplex Concrete Machinery Co.
*Stearns Mfg. Co.
Zagelmeyer Cast Stone Block Machy. Co.

Netting (Locomotive Stack)
*Tyler Co., W. S.

Nozzles (Gravel Washing)
Chain Belt Co.
*Deister Concentrator Co.

Nozzles (Hydraulic) (See Guns—Hydraulic)

Nozzles (Spray)
Chain Belt Co.
*Deister Concentrator Co.
*Link-Belt Co.

Outdoor Lighting Equipment
*General Electric Co.

Packings
Quaker City Rubber Co.
Republic Rubber Co.

Pallets
Anchor Concrete Machy. Co.
Commercial Shearing & Stamping Co.
*Multiplex Concrete Machinery Co.
*Stearns Mfg. Co.
Zagelmeyer Cast Stone Block Machy. Co.

Partitions (Wire)
*National Wire Cloth Co.

Paving Mixers
Chain Belt Co.
*Jaeger Machine Co.
*Koehring Co.

Perforated Metal Plates
Chicago Perforating Co.
Cross Engineering Co.
*Hendrick Mfg. Co.
*Sprout, Waldron & Co.

Photo-Electric Cells
*General Electric Co.

Pipe, Dredge (Floating and Shore)
*Chicago Bridge & Iron Co.
Frog, Switch & Mfg. Co.
Naylor Pipe Co.
Taylor Forge & Pipe Works

Pipe Flanges
Frog, Switch & Mfg. Co.
Hetherington & Berner, Inc.
Naylor Pipe Co.
Taylor Forge & Pipe Works

Pipe Fittings
Hetherington & Berner, Inc.

Pipe Forms (Concrete)
*Concrete Pipe Machinery Co.
Quinn Wire & Iron Works
*Universal Concrete Pipe Co.

Pipe Machines (Concrete)
*Concrete Pipe Machinery Co.
Quinn Wire & Iron Works
*Universal Concrete Pipe Co.

Pipe (Spiral)
Naylor Pipe Co.
Taylor Forge & Pipe Co.

Pipe (Water, Gas, Low Pressure Steam)
Hetherington & Berner, Inc.

Pipe (Welded)
*Chicago Bridge & Iron Co.
Naylor Pipe Co.
Taylor Forge & Pipe Co.

Plants (Aggremeter)
*Erie Steel Construction Co.

Plug Valves (See Valves)

Pneumatic Conveying Systems (See Conveyors—Pneumatic)

Pneumatic Drills (See Drills, Rock)

Poidometers
Schaffer Poidometer Co.

Portable Conveyors
*Fuller Company
Haiss Mfg. Co., Geo.
*Link-Belt Co.
*Robins Conveying Belt Co.

Portable Crushing and Screening Plants
Brooks Equip. & Mfg. Co.
*Diamond Iron Works
*Gruendler Crusher & Pulverizer Co.
*Link-Belt Co.
*Williams Patent Crusher & Pulverizer Co.

Portable Engines (See Engines—Internal Combustion)

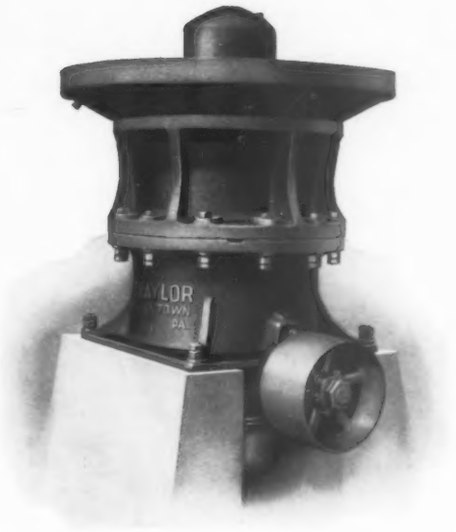
Portable Loaders (See Loaders and Unloaders)

Powder, (Black, Blasting) (See Explosives)

Power Shovels (See Shovels, Electric, Internal-Combustion and Steam)

Power Tampers (Concrete)
Anchor Concrete Machy. Co.
Hollostone Co.
*Kent Machine Co.
*Multiplex Concrete Machinery Co.
*Stearns Mfg. Co.
Zagelmeyer Cast Stone Block Machy. Co.

* See also information in the 1939 Pit and Quarry HANDBOOK.



Our Type H Jaw Crusher is the lightest, strongest and most efficient Blake type crusher ever built. See our Bulletin 1105.

every user is a booster for the

TRAYLOR

TY REDUCTION CRUSHER

It is not necessary to "ask the man who owns" a Traylor TY—he's only too ready to "tell the world" what a big money maker he's found it to be.

We wish you could hear some of these stories and read the enthusiastic letters we receive about the TY—but, after all, the convincing thing to do is to USE one.

Why don't you modernize your fine crushing with a TY—the only crusher that will do the job efficiently and profitably?

Investigate this machine. The full story is told in our Bulletin 2112. Yours for the asking!

TRAYLOR ENGINEERING & MANUFACTURING CO.

ALLENTOWN, PENNSYLVANIA, U.S.A.

NEW YORK CITY 3916 Empire State Bldg.
CHICAGO 815 One La Salle St. Bldg.
SALT LAKE CITY 101 West Second South St.
LOS ANGELES 919 Chester Williams Bldg.
SEATTLE 6311 22nd Ave., N. E.
THE CANADIAN FAIRBANKS-MORSE CO., LTD. 980 St. Antoine St., Montreal, P. Q. Canada
B. C. EQUIPMENT CO., LTD. Vancouver, B. C. Canada
MAQUINARIA INTERNACIONAL, S. R. L. Av. Francisco I. Madero No. 17 Desp. 214, Mexico, D. F., Mexico
MANILA MACH. & SUPPLY CO., INC. Manila and Baguio, P. I.

Export Department—104 Pearl St., New York City.

Foreign Sales Agencies: London, Lima, Sao Paulo, Rio de Janeiro, Buenos Aires, Santiago, Valparaiso, Antofagasta, Iquique, Oruro

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One SLY UNIT FILTER SOLVES DUST PROBLEM

AT THREE POINTS IN ROCK CRUSHING PLANT

★ The data for this series of advertisements describing actual dust control installations in crushed stone plants is taken from our files. The advertisements are presented to help you conform to insurance regulations, state and local laws, and to improve working conditions. They explain how one Sly Unit Filter effectively and economically controls several sources of dust at one time.

CASE NO. 3

You, too, may be faced with an emergency as was the owner of a new rock crushing plant in New York. Due to the insistence of the state inspector, a remedy for the dust had to be found immediately—and inexpensively.

Dust occurred at three points:

(1) Where feeder belt conveyors emptied rock into jaw crusher
(2) Where jaw crusher discharged into boot of bucket elevator
(3) Where bucket elevator discharged onto belt conveyor carrying rock to bins

The solution was a No. 34 Sly Unit Filter with suitable hoods and enclosures—a 5" exhaust pipe to (1) a 7" pipe to (2) and a 4" pipe to (3—*with the filter located only 34' from this third point, the longest connection.* Very little piping was required; a 5 H.P. motor was sufficient for operation of fan.

The filter offered an unusually large amount of filtering capacity for the small amount of space occupied and cost, exclusive of piping, only $807. The cost of equipment and operation thus added but slightly to the cost of production and solved the problem immediately and inexpensively.

Ask for Bulletin P-90

THE W. W. SLY MANUFACTURING COMPANY

4745 Train Avenue — Cleveland, Ohio

BRANCH OFFICES IN PRINCIPAL CITIES

BLAST CLEANING EQUIPMENT — SLY — TUMBLING MILLS

DUST CONTROL EQUIPMENT FOR EVERY INDUSTRIAL PURPOSE

BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

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Power Units (Internal Combustion)
Caterpillar Tractor Co.
Cummins Engine Co.
National Supply Co. of Del.
*Nordberg Mfg. Co.
Superior Diesel Engine Division of the National Supply Co.

Pre-formed Wire Rope
Broderick & Bascom Rope Co.
*Hazard Wire Rope Division of the American Chain & Cable Co., Inc.
Leschen & Sons Rope Co., A.

Press Machines (Hand, Concrete)
Anchor Concrete Machy. Co.
Hollostone Co.
*Kent Machine Co.
*Multiplex Concrete Machinery Co.
*Stearns Mfg. Co.
Zagelmeyer Cast Stone Block Machy. Co.

Proportioning Equipment
*Blaw-Knox Co.
*Erie Steel Construction Co.
Heltzel Steel Form & Iron Co.
*Jaeger Machine Co.
Schaffer Poidometer Co.

Pulleys
*Link-Belt Co.
Sprout, Waldron & Co.

Pulleys (Magnetic)
Sprout, Waldron & Co.

Pulleys (Wing)
Sprout, Waldron & Co.

Pulverized Fuel Systems
*Hardinge Co.
*Raymond Pulverizer Division of the Combustion Engineering Co.

Pulverizers (See also Crushers, Mills, etc.)
*American Pulverizer Co.
*Brooks Equip. & Mfg. Co.
*Gruendler Crusher & Pulverizer Co.
*Hardinge Co.
Lewistown Foundry & Machine Co.
New Holland Machine Co.
*Raymond Pulverizer Division of the Combustion Engineering Co.
*Smidth & Co., F. L.
Straub Mfg. Co.
Traylor Engr. & Mfg. Co.
*Williams Patent Crusher & Pulverizer Co.

Pump Valves (See Valves, Pump)

Pumps (Air-Lift)
*Fuller Company

Pumps (Bulk Cement)
*Fuller Company

Pumps (Cement Slurry)
*Morris Machine Works
*Smidth & Co., F. L.

Pumps (Centrifugal)
Chain Belt Co.
Gardner-Denver Co.
Hetherington & Berner, Inc.
*Jaeger Machine Co.
Kansas City Hay Press Co.
*Morris Machine Works

Pumps (Dewatering)
*Morris Machine Works

Pumps (Dredging)
Bucyrus-Erie Co.
Hetherington & Berner, Inc.
Kansas City Hay Press Co.
*Morris Machine Works

Pumps (Sand and Gravel)
Hetherington & Berner, Inc.
Kansas City Hay Press Co.
*Morris Machine Works

Pumps (Turbine)
*Morris Machine Works

Pumps (Vacuum)
*Fuller Company

Pumps (Vertical)
*Morris Machine Works

Pumps (Well)
*Morris Machine Works

Racks (Curing)
Anchor Concrete Machy. Co.
Hollostone Co.
*Kent Machine Co.
*Multiplex Concrete Machinery Co.
*Stearns Mfg. Co.
Zagelmeyer Cast Stone Block Machy. Co.

Railways (Electric)
*General Electric Co.

Ready-Mixed Concrete Plants
Chain Belt Co.
*Erie Steel Construction Co.
Heltzel Steel Form & Iron Co.
*Jaeger Machine Co.

Recording Instruments & Meters
*General Electric Co.

Rectifiers
*General Electric Co.

Regulators (Voltage)
*General Electric Co.

Relays
*General Electric Co.

Remote Control Systems
*General Electric Co.

Rheostats
*General Electric Co.

Rock Bit Grinders
Alloy Steel & Metals Co.

Rock Drills (See Drills—Rock)

Rod Mills
*Hardinge Co.
*Traylor Engr. & Mfg. Co.

Rods (Welding)
Gilmore Wire Rope Div. of Jones & Laughlin Steel Corp.
Stulz-Sickles Co.
Wall-Colmonoy Corp.

Rope (Wire) (See Wire Rope)

Rubbish Burners
Cross Engineering Co.

Sand and Gravel Handling Equipment
Chain Belt Co.
*Link-Belt Co.

Sand-Lime-Brick Machinery
*Hardinge Co.

Sand Separators
*Link-Belt Co.
McLanahan and Stone Corp.
Simplicity Engr. Co.
Smith Engr. Works

Sand-Settling Tanks
*Chicago Bridge & Iron Co.
*Link-Belt Co.
*Nordberg Mfg. Co.
Smith Engr. Works

Scrapers (Power Drag)
Co.
*Link-Belt Co.
*Sauerman Bros., Inc.

Scrapers (Wagon)
*Bucyrus-Erie Co.

Screens
Bacon, Inc., Earle C.
Chain Belt Co.
Chicago Perforating Co.
Cleveland Wire Cloth & Mfg. Co.
Cross Engineering Co.
*Deister Concentrator Co.
*Deister Machine Co.
*Diamond Iron Works
*Eagle Iron Works
Frog, Switch & Mfg. Co.
*Gruendler Crusher & Pulverizer Co.
*Haiss Mfg. Co., Geo.
*Hardinge Co.
*Hendrick Mfg. Co.
Industrial Brownhoist Corp.
Lewistown Foundry & Machine Co.
*Link-Belt Co.
Ludlow-Saylor Wire Co.
Manganese Steel Forge Co.
McLanahan and Stone Corp.
*National Wire Cloth Co.
*Nordberg Mfg. Co.
*Robins Conveying Belt Co.
*Roebling's Sons Co., John A.
Simplicity Engr. Co.
Smith Engr. Works
Sprout, Waldron & Co.
Straub Mfg. Co.
*Traylor Engr. & Mfg. Co
Twin City Iron and Wire Co.
*Tyler Co., W. S.

Screens (Vibrating or Shaking)
*Deister Concentrator Co.
*Deister Machine Co.
*Diamond Iron Works
*Gruendler Crusher & Pulverizer Co.
Lewistown Foundry & Machine Co.
*Link-Belt Co.
McLanahan and Stone Corp.
New Holland Machine Co.
*Nordberg Mfg. Co.
*Robins Conveying Belt Co.
Screen Equipment Co.
Simplicity Engr. Co.
Smith Engr. Works
Sprout, Waldron & Co.
Straub Mfg. Co.
*Tyler Co., W. S.
*Williams Patent Crusher & Pulverizer Co.

Scrubbers
*Link-Belt Co.
*Traylor Engr. & Mfg. Co.
*Tyler Co., W. S.

Semi-Trailers (Side or End-Dumping)
*Easton Car & Construction Co.

Separators (Air) (See Air Separators)

Separators (Slurry)
*Smidth & Co., F. L.

Sheaves
Chain Belt Co.
*Eagle Iron Works
Frog, Switch & Mfg. Co.
*Gruendler Crusher & Pulverizer Co.
*Haiss Mfg. Co., Geo.
Hetherington & Berner, Inc.
*Link-Belt Co.
McLanahan and Stone Corp.
Sanford-Day Iron Works
Sprout, Waldron & Co.

Shovels (Electric, Internal-Combustion and Steam)
*Bay City Shovels, Inc.
*Bucyrus-Erie Co.
Industrial Brownhoist Corp.
*Koehring Co.
*Lima Locomotive Works
*Link-Belt Co.
Marion Steam Shovel Co.
Northwest Engineering Co.
Thew Shovel Co.

Silos
Chain Belt Co.
*Chicago Bridge & Iron Co.
McCarter Iron Works, Inc., The
*Smidth & Co., F. L.

Skids
*Easton Car & Construction Co.

Skip Hoists and Skips
Chain Belt Co.
Hetherington & Berner, Inc.
*Link-Belt Co.
McCarter Iron Works, Inc., The
*Robins Conveying Belt Co.

Sleeves (Dredge)
Quaker City Rubber Co.

Speed Reduction Units
Chain Belt Co.
*General Electric Co.
*Link-Belt Co.

Spouts (See Chutes and Chute Liners)

Spaders
Gardner-Denver Co.

Sprays
*Deister Concentrator Co.

Sprockets and Chain
Chain Belt Co.
*Link-Belt Co.
Sprout, Waldron & Co.
Straub Mfg. Co.

Starters (Automatic Motor)
*General Electric Co.

Steel (Alloy)
(See Alloys—Steel)

Steel (High Tensile)
Gilmore Wire Rope Div. of Jones & Laughlin Steel Corp.
Manganese Steel Forge Co.

Steel (Open Hearth)
Gilmore Wire Rope Div. of Jones & Laughlin Steel Corp.
Manganese Steel Forge Co.

Steel Grating (See Grating, Steel)

Steel Plate Construction
*Chicago Bridge & Iron Co.
Gilmore Wire Rope Div. of Jones & Laughlin Steel Corp.
Heltzel Steel Form & Iron Co.
Hetherington & Berner, Inc.
Manganese Steel Forge Co.
McCarter Iron Works, Inc., The
Sprout, Waldron & Co.

Stone Grapples
Owen Bucket Co.

Storage Equipment
Chain Belt Co.
*Chicago Bridge & Iron Co.
*Erie Steel Construction Co.
*Haiss Mfg. Co., Geo.
*Link-Belt Co.
*Sauerman Bros., Inc.

Switchboards (Electric)
*General Electric Co.

Switches (Electric)
*General Electric Co.

Switches (Safety)
*General Electric Co.

Tachometers
Bristol Co.

Tamp Machines (Hand, Concrete)
Anchor Concrete Machy. Co.
Hollostone Co.
*Kent Machine Co.
*Multiplex Concrete Machinery Co.
*Stearns Mfg. Co.
Zagelmeyer Cast Stone Block Machy. Co.

Tanks
*Chicago Bridge & Iron Co.
Heltzel Steel Form & Iron Co.
*Hendrick Mfg. Co.
*Link-Belt Co.
McCarter Iron Works, Inc., The
*Traylor Engr. & Mfg. Co.

Tanks (Elevated Steel)
*Chicago Bridge & Iron Co.

Tanks (Sand-Settling)
*Chicago Bridge & Iron Co.
*Link-Belt Co.
Smith Engr. Works

Testing Sieves and Shakers
*Hendrick Mfg. Co.
*Tyler Co., W. S.

Tools (Drill) (See Drilling Accessories)

Track Shifters
*Nordberg Mfg. Co.

Tractors
Caterpillar Tractor Co.

Trailers
Ford Motor Co.
Marmon-Herrington Co.
Sterling Motor Truck Co.

Trailers (Dump)
*Le Tourneau, Inc., R. G.
Sanford-Day Iron Works

Trailers (Industrial)
Ford Motor Co.
Marmon-Herrington Co.
Sterling Motor Truck Co.

Trailers (Industrial & Quarry)
*Easton Car & Construction Co.

Trailers (Motor Truck)
Hug Co., The

Tramways (Aerial Wire Rope)
Bethlehem Steel Co.
*Roebling's Sons Co., John A.

Transformers
*General Electric Co.

Transmission Belting (See Belting)

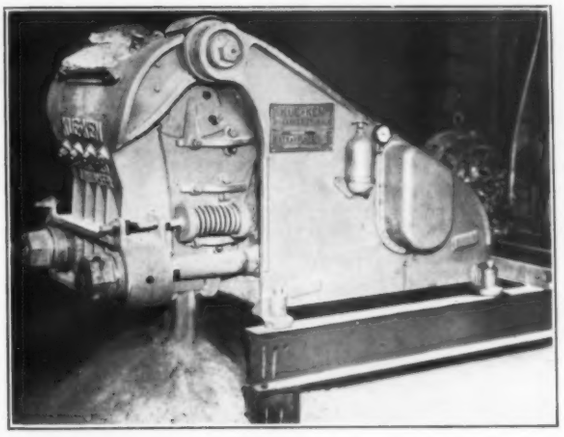
* See also information in the 1939 Pit and Quarry HANDBOOK.

BEFORE YOU BUY A CRUSHER

SEND US A SAMPLE OF YOUR OWN MATERIAL FOR A FREE CRUSHING TEST WE WILL PROVE TO *YOUR OWN SATISFACTION* THAT A KUE-KEN BALANCED CRUSHER WILL SAVE YOU MONEY.

The large rocks between the pans is the KUE-KEN crusher feed. The material in the pans shows the tremendous reduction ratios (as much as 72 to 1) that are practical **only** in a KUE-KEN balanced crusher. Only KUE-KEN crushes without abrasion or rubbing. Insures less wear, less power. Mechanism runs in sealed and filtered oil bath. A guarantee of low maintenance cost and longer life. All steel construction and balanced design permits light weight for real portability.

Bulletin 600 gives details of free crushing service and facts that more than prove our claims—"faster and finer crushing at less cost than ever before."



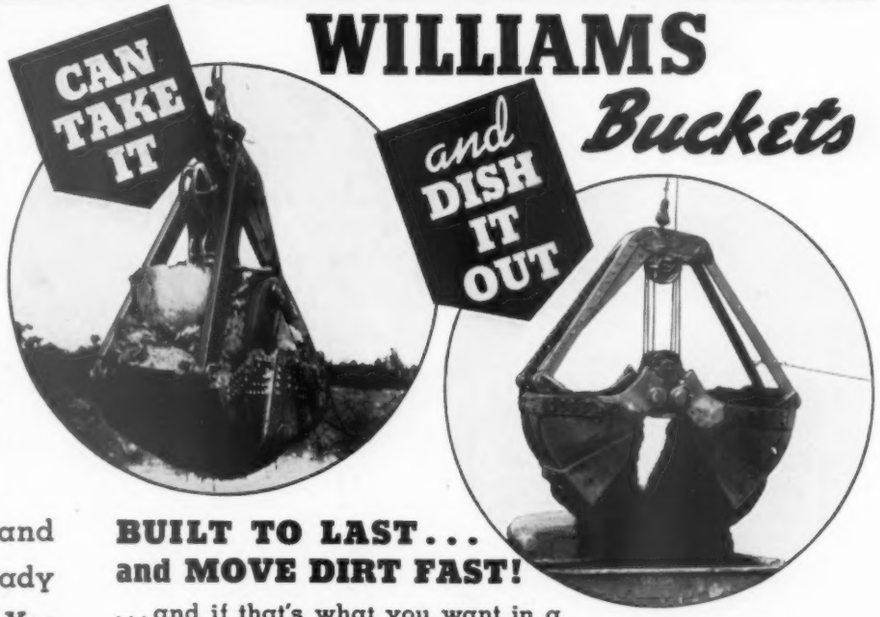
This number 50 KUE-KEN crusher is crushing to 1/8". Notice the stream of finely crushed rock discharging at the bottom of the jaws. The feed is 8" to 10" quartz without "fines." Quick, positive jaw setting from 1/8" up. Perfect balance eliminates vibration and the need of large expensive foundations.

SEND FOR BULLETIN NO. 600 TODAY

STRAUB MFG. CO. 528 CHESTNUT STREET OAKLAND, CALIFORNIA

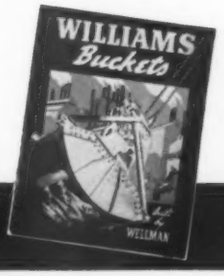
That's why Williams Buckets are profit producers. *Can they take it!* Man, they're built to tear into the heaviest, toughest, roughest digging. Williams Buckets stand up for years under most gruelling service. *And can they dish it out!* Just watch a Williams Bucket come up with a full capacity bite, and dump the load swiftly and cleanly...then swing back ready to wade into action again. Yes sir, Williams Buckets are truly

WILLIAMS *Buckets*



BUILT TO LAST... and MOVE DIRT FAST!

...and if that's what you want in a bucket, you'll find your particular type in the Williams Catalog. It's free!



THE WELLMAN ENGINEERING CO., 7014 Central Ave., CLEVELAND, OHIO

Send for Catalog. Distributors located in all parts of the Country represent the Williams Line of Power-Arm, Multiple Rope, Power-Wheel, Single Line, Hook-On and Dragline Buckets.

***built by* WELLMAN**

BUYERS' GUIDE

A Directory of Pit and Quarry Advertisers Indexed According to Product.

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Transmission Machinery
Chain Belt Co.
*Gruendler Crusher & Pulverizer Co.
*Link-Belt Co.

Trippers
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*Link-Belt Co.
*Robins Conveying Belt Co.

Truck Cranes (See Cranes)

Truck Mixers
*Blaw-Knox Co.
Chain Belt Co.
*Jaeger Machine Co.
Ransome Concrete Machy. Co.
*Smith Co., T. L.

Trucks and Trailers
(See Motor Trucks)

Trucks (Industrial Electric & Gas Electric)
*Easton Car & Construction Co.

Tubes for Tire Casing
Quaker City Rubber Co.

Tube-Mills (See Mills—Ball, Tube, etc.)

Turbines
*General Electric Co.

Turntables (Industrial)
*Easton Car & Construction Co.

Unit Heaters
*General Electric Co.

Unloaders (Box Car)
Chain Belt Co.
*Fuller Co.
*Link-Belt Co.

Valves (Pump)
Quaker City Rubber Co.
Taylor Forge & Pipe Works

Variable Speed Reducers or Transmissions
Chain Belt Co.
*Link-Belt Co.

Vibrating Screen Plate
Chicago Perforating Co.
Cross Engineering Co.
*Hendrick Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.

Vibrating Screens (See Screens—Vibrating)

Vibrators
*Link-Belt Co.
*Tyler Co., W. S.

Vibrators (Concrete)
Anchor Concrete Machinery Co.
*Multiplex Concrete Machy. Co.
*Stearns Mfg. Co.

Wagons (Dump)
*Koehring Co.
*Le Tourneau, Inc., R. G.

Washers (Sand, Gravel and Stone)
*Diamond Iron Works
*Eagle Iron Works
*Haiss Mfg. Co., Geo.
*Hardinge Co.
Lewistown Foundry & Mach. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
*Smidth & Co., F. L.
Smith Engr. Works
Straub Mfg. Co.
*Traylor Engr. & Mfg. Co.
*Tyler Co., W. S.

Wearing Parts (Machinery)
(See Machinery Wearing Parts)

Weighing Equipment (Automatic)
*Blaw-Knox Co.
*Erie Steel Construction Co.
*Fuller Co.
Heltzel Steel Form & Iron Co.
*Jaeger Machine Co.
McCarter Iron Works, Inc., The
Schaffer Poidometer Co.

Welding Bars, Wedge and Applicator (Nickel - Manganese Steel)
Stulz-Sickles Co.

Welding and Cutting Equipment
*General Electric Co.
Stulz-Sickles Co.

Welding Rods
Stulz-Sickles Co.
Wall-Colmonoy Corp.

Welding Service
Stulz-Sickles Co.

Welding Supplies
*General Electric Co.
*Roebling's Sons Co., John A.
Manganese Steel Forge Co.

Wheels (Car)
Sanford-Day Iron Works

Winches and Capstans
Alloy Steel & Metals Co.
Chain Belt Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Wire and Cable (Electric)
*General Electric Co.
*Roebling's Sons Co., John A.

Wire Cloth
Cleveland Wire Cloth & Mfg. Co.
Ludlow-Saylor Wire Co.
Manganese Steel Forge Co.
*National Wire Cloth Co.
*Robins Conveying Belt Co.
*Roebling's Sons Co., John A.
Twin City Wire & Iron Co.
*Tyler Co., W. S.

Wire Rope
Bethlehem Steel Co.
Broderick & Bascom Rope Co.
Gilmore Wire Rope Div. of Jones & Laughlin Steel Corp.
*Hazard Wire Rope Division of the American Chain & Cable Co., Inc.
Leschen & Sons Rope Co., A.
*Roebling's Sons Co., John A.

Wire Rope Fittings
Bethlehem Steel Co.
Broderick & Bascom Rope Co.
Gilmore Wire Rope Div. of Jones & Laughlin Steel Corp.
*Hazard Wire Rope Division of the American Chain & Cable Co., Inc.
Leschen & Sons Rope Co., A.
*Roebling's Sons Co., John A.

Wire Rope Slings
Bethlehem Steel Co.
Broderick & Bascom Rope Co.
Gilmore Wire Rope Div. of Jones & Laughlin Steel Corp.
*Hazard Wire Rope Division of the American Chain & Cable Co., Inc.
Leschen & Sons Rope Co., A.
*Roebling's Sons Co., John A.

Wire (Welding)
Gilmore Wire Rope Div. of Jones & Laughlin Steel Corp.
Manganese Steel Forge Co.
*Roebling's Sons Co., John A.

Worm Gears (See Gears and Pinions)

* See also information in the 1939 Pit and Quarry HANDBOOK.

BROADCAST SECTION

FOR SALE

3—General Electric, Gasoline engine Generating Sets, 25 K.W. 115 Volts, D. C. direct connected to 43-54 H.P. General Electric Gasoline Engine 560 RPM.

BURTON MACHINE CO., Inc.
401-3 Chestnut Street, Norfolk, Virginia

WANTED

Concrete Products Plant Manager capable of building small sand and gravel plant and assuming complete charge of production, sales and management. Investment $5,000 required. Write

CONCRETE PRODUCTS CO.
700 North 7th Avenue
Tucson - - - - - - - - - Arizona

FOR SALE

One Kennedy Van Saun No. 19 crusher, serial 1495.

CLIFFORD WATERHOUSE
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USED TRUCK MIXERS
WITH OR WITHOUT TRUCKS

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Clark Tractor with Coal Body; also Permanent Coal Unloader with Bin.

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One 3′ Coarse Bowl Symons Cone Crusher.
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2—3′ Symons Cone Crushers, each with 50 H.P. direct connected motor; one coarse and one fine bowl.
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6—Robins Belt Conveyors, trough type, with roller bearing idlers, Model W Goodyear belt, each conveyor equipped with Falk gear reducer, roller chain drive and motor. Each mounted on 5″ steel channels:
1—30″ wide—212′ c/c
1—24″ wide—237′ c/c
1—20″ wide—212′ c/c
1—20″ wide—252′ c/c
1—20″ wide—288′ c/c
1—20″ wide—302′ c/c

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7—Traylor Vibrating Screens, made by Traylor Vibrator Co., Denver, Colo. (Now made by Jeffrey Mfg. Co., Columbus, Ohio). Two FB-2—41″ wide by 72″; Five FB-4—48″ wide x 84″.
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1—6″ Rumsey Pump, Fig. 1160, with direct connected 100 H.P. Westinghouse motor.

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3—Rotary Scrubbers or Washers—1—4′x6′, 2—4′x8′, each with roller chain drive and 20 H.P. motor. Stationary drums with revolving agitators.

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1 Fuller Kinyon Type B portable cement loader.
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2—Williams Favorite, ¾ yd., digging clamshell.
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Portable Crushing Plants, jaw & gyratory types.
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1—Lorain 77-D ser. No. 5682 (new 1938) powered by Caterpillar mod. 13,000 Diesel engine, 60' boom, 1¼ yd. Kiesler clamshell bucket.
1—P & H mod. 650 ser. No. 4188, 65' box type boom, 1¼ yd. bucket.
2—Northwest mod. 104, ser. Nos. 2079 & 1597, 45' boom, 1¼ yd. bucket; one with 1 yd. shovel attachment.
1—Link Belt K-42 ser. No. 1265, 45' boom, 1¼ yd. bucket; also have 1 yd. trench hoe attachment or 1¼ yd. shovel front.
2—Northwest mod. 105, ser. Nos. 2053 & 1522, 40' boom, 1 yd. bucket.
1—Link Belt K-1 ser. No. 1024, 50' boom, 1 yd. bucket.
1—Moore Speed Crane ser. No. 179, 60' boom, ¾ yd. bucket.
2—Osgood Heavy Duty, ser. Nos. 2069 & 2087, 40' boom, 1 yd bucket & one with 1 yd. shovel attachment.
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1—Universal mod. 35, ser. No. 1200, 50' boom, ½ yd. bucket.
1—Byers Bearcat mod. 37, ser. No. 3299, 30' boom, ½ yd. bucket.
1—Erie type B-2, ser. No 4122, 1 yd. comb. steam shovel and crane, 40' boom.

CRANES (Gasoline Locomotive)

1—12 ton Brownhoist gas crane No. 2, ser. No. 8881, 8 wheel, 40' boom.

CRUSHERS

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3—Jaw: 1—14"x36" Cedar Rapids; 1—10"x20" Climax No. 2½; 1—9"x16" Telsmith No. 9-A.
1—Set of Allis Chalmers smooth type crushing rolls 42"x16".

DERRICKS

4—Steel stiff leg; 1—15 ton Clyde, 50' boom; 1—15 ton Clyde "A" frame barge derrick, 50' boom; 1—10 ton Insley, 80' boom; 1—5 ton Insley, 80' boom.
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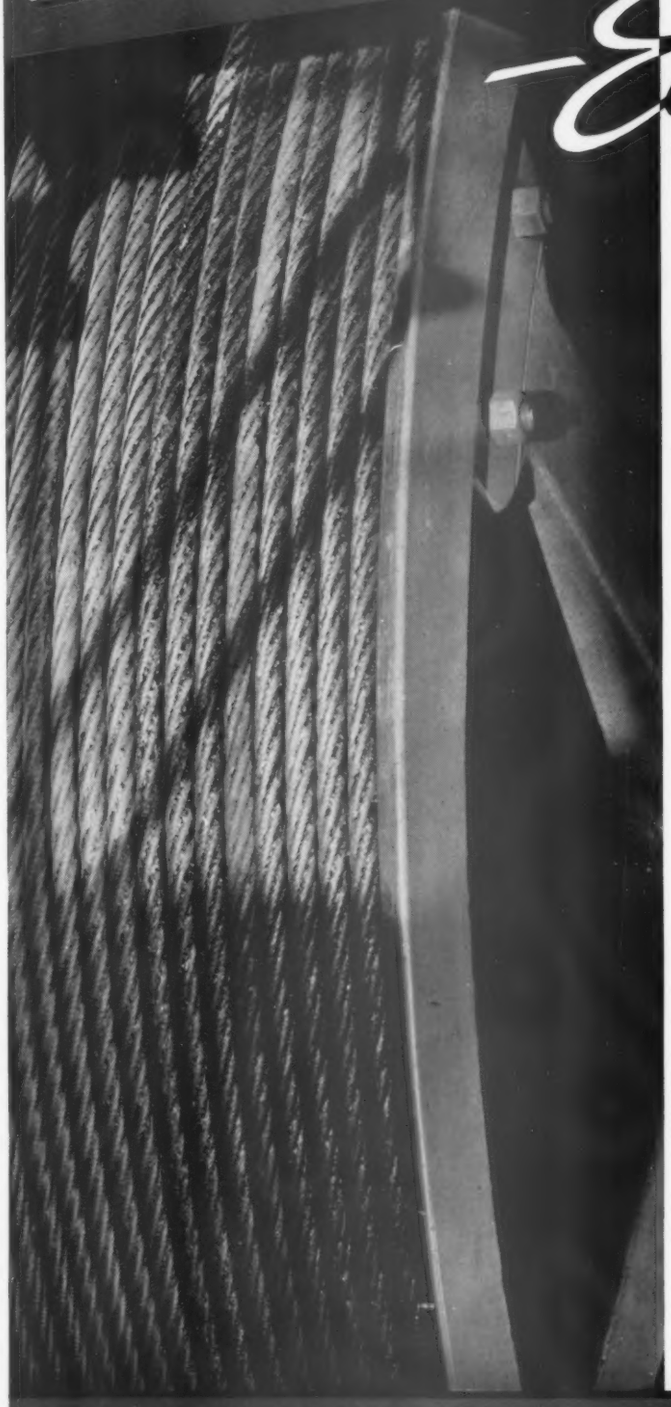

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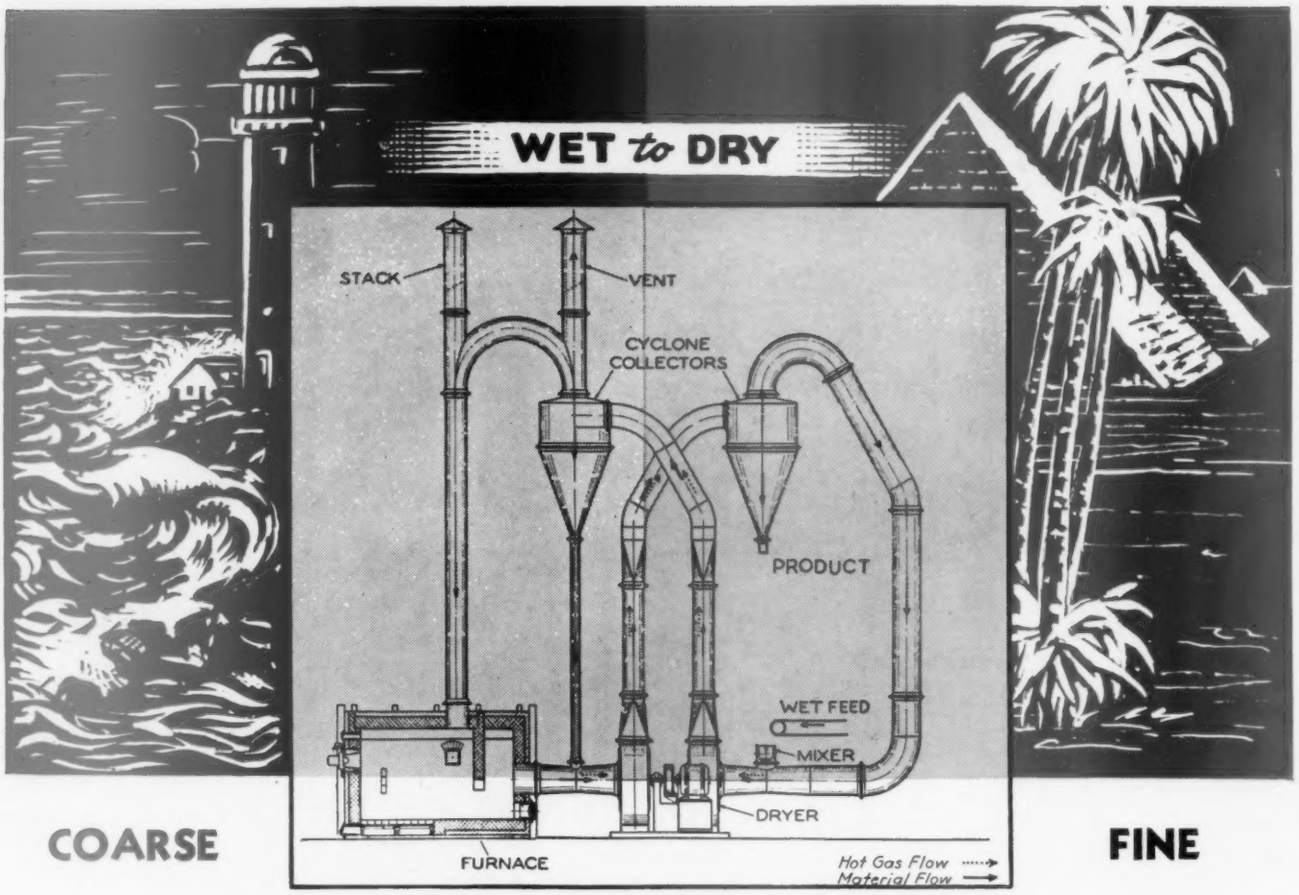

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